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NATIONAL POTATO BREEDING PROGRAM, 1979

Edited by
Raymon E. Webb

Fiftieth Annual Report by Cooperators
Beltsville Agricultural Research Center
Beltsville, Maryland

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U. S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
SOIL SURVEY

This progress report includes tentative results of research not sufficiently complete to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Therefore, this report is not intended for publication and should not be referred to in literature citations.

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UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC), BELTSVILLE, MARYLAND
AND CHAPMAN AND AROOSTOOK FARMS, PRESQUE ISLE, MAINE

Raymon E. Webb, Philip Baum, George W. L. Walter, and Robert W. Goth, BARC
and
David R. Wilson, Presque Isle, Maine

BARC

Breeding and Evaluation: Ninety-five clones and varieties possessing a diversity of economic characteristics were included in the breeding blocks. Approximately 3,000 hybrid seed lines were obtained. One hundred eleven selected hybrid seed populations were grown for tuber production. Approximately 72,000 seedling tubers were produced for distribution in 1980. Approximately 200 clones were evaluated for resistance to viruses A, X, and Y. One hundred fifteen clones were evaluated for resistance to races 1, 2, 3, 4 of late blight.

Distribution of Materials: Distribution of true seed, seedling tubers, advanced selections, and varieties is given in Tables 1, 2, and 3.

PRESQUE ISLE

Planting began May 14 and was interrupted by inclement weather (Table 4) from May 24 until June 6. Planting was completed June 15. Adequate moisture and moderate temperatures prevailed through plant emergence and early growth. A 5-week drought began the week of July 14 resulting in severely decreased yields on both Aroostook and Chapman Farms. Vine kill and harvest periods were excessively wet, and total tuber solids content was much below normal.

CHAPMAN FARM

Approximately 20,000 seedling tubers from 111 parental combinations developed at BARC were planted for selection purposes and later multipest-resistance screening. Two thousand 12-hill lots were grown for additional selection, and pest resistance and quality evaluations. Sixty, eighty and hundred-hill lots were grown for further horticultural and pest resistance evaluations and interregional preliminary adaptability trials. Clones B6969-2, B6987-184, and B7583-6 were grown in commercial production trials.

AROOSTOOK FARM

Varietal collections and older breeding lines were grown for maintenance and distribution to cooperators. Yield and disease resistance trials were done on Aroostook Farm and nearby Silvers Farm. Experimental design for all yield trials was a randomized block with four replications of 25 seed pieces each. White tuber trials received 150 pounds NPK per acre, and russet types received 180 pounds NPK per acre banded with a two-row planter. Seed spacing for white tuber trials was 9 inches and russet trials 12 inches. All plantings were done by hand.

Cultural methods and materials for weed, insect, and disease control were according to local recommendations. Rainfall and temperature during the season are given in Table 4. At harvest, all entries were graded and samples hand selected for specific gravity and quality evaluations. Specific gravity was determined by the air-water method. Following specific gravity determinations, selected samples were divided and placed at 50° F, 45° F, and 40° F storage at 90 percent relative humidity.

Samples stored at 50° F and 45° F were processed into chips after 2 months in storage. Samples stored at 40° F were divided into two groups: one group to be reconditioned at 70° F for 2 weeks prior to frying; and one group to be fried direct from 40° F after 4 months' storage if processing data from the 50° F stored group indicated potential low reducing sugar content buildup at that temperature. Russet samples were also processed into french fries.

Potato chips were made from each sample by cutting the russet tubers in half and taking a 1/16-inch thick slice from each tuber with a rotary food slicer. Slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

A french fry plug, 3/8 inch in diameter, was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed, and excess water removed, they were fried at 365° F in Primex shortening for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French fry classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made by using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classified as 1 = mealy, 2 = intermediate, or 3 = soggy, and a weighted texture index calculated.

SUMMARY

Drought conditions during July to mid-August severely reduced yields (Tables 5-13), and subsequent excessive moisture caused growth cracking in the more susceptible lines, both in the foundation seed plots and the later harvested yield trials. Little second growth (knobs, malformations) was noted in most of the russet lines. Specific gravities and processing qualities were adversely affected by the excessive moisture in late August and during the harvest period. The early clone, B6969-2, will be named the variety Oceania in 1980. The high solids, golden-nematode-resistant clone, B6987-184, will be released, in part, because of its high solids and excellent chipping quality. B7583-6, a late maturing, oblong russet clone with excellent baking quality, will be released in 1980. Golden-nematode resistant, round white clones B7592-1 and B7805-1 and russet clones B8934-4 and B8943-4 are in preliminary grower trials. Russet clone B8972-1 is in the initial seed increase phase.

Table 1. Distribution of first-year seedling tubers and true seed from BARC, 1979.

Location	Cooperator	Progeny	Number	
			Seedling Tubers	True Seed
<u>Domestic</u>				
Colorado	J. Twomey	86	16,700	-
Kansas	T. Wagner	10	1,600	-
Maine	D. Wilson	111	20,200	-
Minnesota	F. Lauer	78	8,500	-
North Carolina	F. Haynes	26	6,050	-
<hr/>			TOTAL	63,050
<hr/>				
<u>Foreign</u>				
Brazil	M. Barrados	1	-	500
Ireland	M. Foxe	2	-	1,000
Israel	T. Ayslon	1	-	300
Pakistan	M. Ismael	2	-	600
Poland	G. White	1	-	300
	D. Wysocka	1	-	300
Spain	A. Orad	1	-	300
<hr/>			GRAND TOTAL	63,050
				3,300

Table 2. Distribution of varieties and clones to U.S. cooperators.

State	Cooperator	Number	
		Varieties	Clones
Arkansas	J. L. Bowers	9	-
California	R. Voss	1	2
Florida	J. R. Shumaker	13	211
Georgia	C. Jaworski	43	-
Idaho	L. Williams	1	-
	J. Pavek	4	3
Kentucky	C. R. Roberts	-	8
Maryland	R. D. Wagner	2	-
Mississippi	W. Mulkey	4	6
	A. J. Halterlein	5	11
New Jersey	M. Henninger	8	479
New York			
Cornell	J. Sieczka	4	58
Long Island	R. Greider	-	43
	R. Cetas	-	21
North Carolina	F. Haynes	-	15
	O. A. Hildago	10	-
Pennsylvania	R. Latin	-	1
	D. MacKenzie	-	37
Ohio	F. Lower	-	6
Oregon	R. McLaughlin	-	1
South Dakota	P. Prashar	1	-
Texas	D. Smallwood	3	-
Virginia	B. Graves	5	239
Washington	M. Martin	2	-
	W. Hoyman	-	3
Wisconsin	J. Johnson	3	-
	M. Rominski	-	1
TOTAL		118	1,145

Table 3. Distribution of varieties and clones to foreign cooperators.

Country	Cooperator	Number	
		Varieties	Clones
Holland	J. Gerritsen	2	-
India	B. B. Nagaich	2	-
	H. Kishore (IPC)	4	-
Jamaica	F. Brately	1	-
Switzerland	F. Winiger	2	-
	TOTAL	11	-

Table 4. Weekly average maximum and minimum temperature and total weekly rainfall, Aroostook Farm, Presque Isle, Maine, 1979.

Week Ending	Temperature (F)		Rainfall Inches
	Maximum	Minimum	
May 5	53	48	.28
May 12	56	38	T
May 19	68	49	.40
May 26	66	48	1.56
June 2	65	49	1.78
June 9	75	51	.78
June 16	76	54	.66
June 23	77	50	1.60
June 30	73	48	.48
July 7	74	49	.84
July 14	84	60	.02
July 21	80	55	.86
July 28	85	62	.38
Aug. 4	83	61	.16
Aug. 11	72	51	.64
Aug. 18	66	44	1.65
Aug. 25	68	54	1.62
Sept. 1	76	53	.28
Sept. 8	75	51	2.52
Sept. 15	65	43	.65
Sept. 22	67	42	.82
Sept. 29	64	38	T
Oct. 6	61	46	.73
Oct. 13	48	32	1.17
Oct. 20	49	33	.11
		TOTAL	19.99

Table 5. Yield, tuber size, distribution, and quality characteristics of clones harvested 110 days after planting (early to medium maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution				Tuber Rating 1/ Gv. 2/	Sp. 2/ Gv. 2/	50°F		40°F	
			<1-7/8"		1-7/8"- 2-1/4"	2-1/4"- 3-1/4"			2 mos. 1.0 Color 3/ Chip		2 weeks 1.0 Color 3/ Chip	
			MKT	CWT								
B7154-6	306	89	11	48	53	3	1	3	73	8.1	-	9.5
B7154-10	290	94	6	36	62	1	1	3	73	6.2	9.9	8.1
B7805-1	282	97	3	15	72	13	-	3	76	8.5	-	9.2
B7930-2	341	91	9	45	52	2	-	3	80	8.4	-	9.6
B8101-3	300	93	7	25	58	14	3	3	78	8.7	-	10.0
B8302-5	242	76	24	66	34	-	-	1	57	9.0	-	9.9
B8375-7	243	91	9	46	50	5	-	3	66	7.8	-	10.0
B8424-10	296	86	14	35	62	3	1	2	68	7.8	-	8.4
B8424-11	267	93	7	22	73	5	-	3	78	6.2	8.9	7.4
B8462-1	275	87	13	43	56	2	-	2	84	6.7	9.5	8.5
B8498-9	266	92	8	33	54	14	-	3	79	6.6	9.9	8.2
B8799-13	228	92	8	56	43	1	-	3	89	6.2	8.7	7.7
B8812-4	153	73	27	75	25	-	-	3	82	7.9	-	8.9
B8907-4	287	94	6	29	63	8	1	3	70	7.6	-	8.8
Superior	327	95	5	24	66	10	-	3	80	7.5	-	8.6
Cobbler	286	90	10	36	54	7	3	1	79	7.6	-	8.8
Monona	260	92	8	35	58	5	3	3	74	6.2	7.6	5.9
LSD 5%		34						3		0.6		

1 = poor; 5 = outstanding
2/ 1.0 omitted
3/ Chip: 1-7 satisfactory; FF: 1-3 satisfactory; texture: 1-2 satisfactory

Table 6. Yield, tuber size, distribution, and quality characteristics of clones harvested 110 days after planting (early to medium maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution			Tuber Rating ^{1/}	Sp. 2/ Gv. 2/	500F			400F		
			1-7/8"- 2-1/4"		2-1/4"- 3-1/4"			2 mos.	400F	2 weeks	400F	2 weeks	
			MKT	≤1-7/8"	2-1/4"	3-1/4"	3-7/4"- 4"	T.0 Color3/ Chip					
B8253-3	337	92	8	30	67	3	-	3	68	8.3	-	10.0	
B8356-1	264	96	4	31	62	5	-	3	69	8.1	-	9.0	
B8429-9	240	88	12	38	56	6	-	3	70	6.8	9.8	8.8	
B8685-4	283	88	12	42	58	1	-	3	78	7.0	8.8	7.6	
B8704-9	290	87	13	46	53	1	-	3	72	8.3	-	9.6	
B8704-12	258	89	11	53	47	1	-	3	71	8.4	-	9.7	
B8740-1	208	90	10	43	55	2	-	3	71	8.5	-	9.2	
B8766-4	229	94	6	32	59	9	-	3	73	7.2	-	9.0	
B8812-13	215	89	11	37	60	3	-	3	68	7.4	-	9.3	
B8832-3	233	84	16	57	42	1	-	3	85	7.5	-	9.1	
B8833-64/	160	73	27	74	26	-	-	2	83	7.9	-	9.2	
B8922-4	194	77	23	70	30	-	-	3	76	9.4	-	9.8	
B8932-2	341	89	11	38	58	4	-	3	76	8.0	-	9.8	
Superior	355	96	4	24	64	10	2	3	74	7.8	-	8.6	
Monona	259	90	10	32	57	11	-	3	68	6.0	7.5	5.6	
Cobbler	313	94	6	23	62	15	-	2	78	8.5	-	9.0	
LSD 5%		25						2		0.7			

^{1/-3/} See footnotes - Table 5.

^{4/} Russet.

Table 7. Yield, tuber size, distribution, and quality characteristics of clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution				Tuber Rating ^{1/}	Sp. 2/ Gv. 2/	50°F		40°F	
			<1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	>4"			1-7/4"- 3-1/4"- 4"	2 mos. Chip	1.0 Color ^{3/} Chip	1.0 Color ^{3/} Chip
B8019-4	359	96	4	15	66	18	1	3	71	9.0	-	10.0
B8588-1	253	86	14	55	45	-	3	75	8.4	-	-	9.0
B8618-5	340	94	6	21	67	13	-	3	77	8.2	-	9.4
B8681-5	327	80	20	51	47	2	-	3	83	6.5	8.5	9.4
B8689-6	261	94	6	26	65	8	-	3	73	8.2	-	9.5
B8692-6	254	91	9	27	68	4	1	3	74	7.7	-	8.9
B8710-16	363	93	7	23	64	10	2	3	74	7.1	8.3	9.8
B8713-24	439	88	12	39	57	4	-	3	70	8.4	-	10.0
B8720-6	361	90	10	37	61	3	-	4	64	6.8	9.2	9.0
B8724-2	372	90	10	41	55	3	1	3	72	8.2	-	8.9
B8757-7	388	88	12	39	55	7	-	3	74	7.8	-	8.5
B8766-1	368	88	12	32	64	4	-	3	78	7.6	-	8.8
B8798-20	291	94	6	34	63	21	-	3	81	7.1	8.3	8.7
Atlantic	399	92	8	25	67	8	-	4	80	7.9	-	7.9
Norchip	323	88	12	41	55	4	1	2	78	7.2	9.2	8.2
Katahdin	381	94	6	21	59	17	3	3	68	8.5	-	8.7
LSD 5%		33						3		0.7		

1/-3/ See footnotes - Table 5.

Table 8. Yield, tuber size, distribution, and quality characteristics of clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution			Tuber Rating ^{1/}	Sp. 2/ Gv. 2/	500F			400F-700F		
			1-7/8"- 2-1/4"		2-1/4"- 3-1/4"			2 mos.			400F		
			1-7/8"	2-1/4"	3-1/4"	>4"		1.0 Color ^{3/} Chip	2 weeks				
B8812-15	321	85	15	27	61	10	2	3	70	7.4	-	9.5	
B8812-16	223	81	19	43	55	2	-	2	70	8.6	-	8.5	
B8821-7	355	95	5	21	66	13	1	3	65	8.9	-	9.7	
B8884-7	316	93	7	31	61	9	-	3	77	9.0	1	9.8	
B88901-6	336	91	9	31	59	10	-	3	67	7.5	-	8.5	
B88922-10	256	82	18	56	43	1	-	2	75	9.4	-	10.0	
AKB8222-24/	376	90	10	26	65	8	2	3	77	8.8	-	10.0	
Q19755	421	83	17	45	52	3	-	2	60	9.9	-	10.0	
AKB7925-34/	311	90	10	47	52	-	1	3	71	9.6	-	9.2	
PaB8543-7	419	95	5	20	65	15	-	3	70	8.9	-	9.8	
BC9103-3 4/	362	93	7	22	63	14	1	3	75	6.8	8.5	8.1	
At1antic	399	93	7	27	64	8	-	3	79	8.1	9.0	7.9	
Denali	344	92	8	31	64	4	-	3	85	8.2	9.6	8.7	
Katahdin	345	93	7	21	60	16	3	3	69	8.5	-	8.7	
LSD 5%	43						3		0.7				

1/3/ See footnotes Table 5

4/ Russet

Table 9. Yield, tuber size, distribution, and quality characteristics of clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution						Tuber Rating 1/ 6v.2/	Sp.2/ 6v.2/	500F			400F						
			<1-7/8"		1-7/8"- 2-1/4"		2-1/4"- 3-1/4"				>4"		2 mos. 1.0 Color37 Chip		1.0 Color37 Chip		2 weeks 1.0 Color37 Chip			
			MKT	CWT	MKT	CWT	MKT	CWT			MKT	CWT	MKT	CWT	MKT	CWT	MKT	CWT		
B7592-1	374	95	5	20	66	12	2	3	71	8.8	-	-	8.8	-	8.8	-	8.8	-		
B7595-7	342	92	8	24	64	11	1	3	66	8.2	-	-	9.4	-	9.4	-	9.4	-		
B7618-6	316	92	8	28	63	9	-	3	72	7.3	-	-	8.6	-	8.6	-	8.6	-		
B7694-1	332	96	4	24	68	5	3	2	72	8.8	-	-	8.8	-	8.8	-	8.8	-		
B7767-2	272	87	13	23	73	4	-	2	71	7.4	-	-	8.7	-	8.7	-	8.7	-		
B7802-2	271	95	5	21	69	10	-	3	73	7.7	-	-	9.7	-	9.7	-	9.7	-		
B7809-5	358	91	9	28	62	4	1	3	76	8.0	-	-	9.1	-	9.1	-	9.1	-		
B7828-13	334	95	5	19	66	10	5	3	81	8.5	-	-	9.6	-	9.6	-	9.6	-		
B8086-3	325	90	10	35	60	5	-	3	76	7.5	-	-	9.2	-	9.2	-	9.2	-		
B8087-6	288	95	5	17	70	11	3	3	70	8.5	-	-	9.3	-	9.3	-	9.3	-		
B8091-8	350	91	9	21	62	13	5	3	76	9.3	-	-	9.7	-	9.7	-	9.7	-		
B8285-3	285	89	11	40	57	2	-	2	80	9.0	-	-	10.0	-	10.0	-	10.0	-		
B8424-15	242	89	11	37	60	4	-	3	81	7.7	-	-	9.3	-	9.3	-	9.3	-		
B8427-8	324	93	7	28	55	11	5	3	82	7.1	-	-	8.9	-	8.9	-	8.9	-		
B8433-4	389	97	3	14	64	16	4	4	62	8.7	-	-	9.9	-	9.9	-	9.9	-		
Atlantic	387	93	7	24	68	6	1	4	80	7.9	-	-	7.8	-	7.8	-	7.8	-		
Katahdin	370	95	5	22	57	14	6	3	69	8.0	-	-	9.0	-	9.0	-	9.0	-		
Norchip	331	89	11	44	54	2	-	3	77	7.3	-	-	8.4	-	8.4	-	8.4	-		
LSD 5%		40							3.3	0.7										

1/-3/ See footnotes - Table 5.

Table 10. Yield, tuber size, distribution, and quality characteristics of clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution				Tuber Rating/ 1/ 4"	Sp. Gv. 2/ 1	50°F		40°F		40°F-70°F	
			1-7/8"		2-1/4"- 3-1/4"				2 mos. 1.0 Color3/ Chip		1.0 Color3/ Chip		2 weeks 1.0 Color3/ Chip	
			<1-7/8"	2-1/4"	2-1/4"	3-1/4"	4"	>4"	1-7/8"- 2-1/4"- 3-1/4"- 4"	2-1/4"- 3-1/4"- 4"	3-1/4"- 4"	>4"	1-7/8"- 2-1/4"- 3-1/4"- 4"	>4"
B8486-1	279	93	7	37	60	3	-	2	83	5.7	7.9	6.0	-	-
B8490-5	247	93	7	23	64	12	2	2	76	6.0	7.2	6.3	-	-
B8491-1	259	95	5	15	54	26	4	2	74	6.5	8.2	7.5	-	-
B8497-36	399	96	4	16	61	21	3	2	71	7.2	-	9.3	-	-
B8615-2	290	93	7	23	63	12	2	3	83	6.5	9.3	8.7	-	-
B8685-5	278	87	13	58	42	-	-	3	80	6.2	8.0	6.8	-	-
B8692-3	276	93	7	31	65	4	-	3	79	7.3	-	8.0	-	-
B8692-12	249	90	10	34	60	6	-	3	78	7.7	-	9.2	-	-
B8799-8	173	89	11	54	45	1	-	3	80	5.9	8.5	7.4	-	-
B8799-16	197	79	21	68	32	-	-	2	82	7.3	-	8.4	-	-
B8812-3	311	92	8	25	66	8	-	3	76	5.7	7.6	7.5	-	-
B8823-9	324	92	8	24	62	12	2	3	73	6.8	8.6	9.4	-	-
B8899-13	324	89	11	28	61	10	2	2	73	8.2	-	8.6	-	-
B8947-3	322	95	5	22	68	10	-	2	74	8.1	-	10.0	-	-
Atlantic	327	92	8	28	64	10	4	3	79	7.1	-	7.5	-	-
Denali	338	90	10	33	59	8	-	2	85	7.6	-	8.6	-	-
Norchip	302	88	12	43	54	3	1	2	78	6.4	9.2	7.9	-	-
Katahdin	340	94	6	18	63	17	1	3	69	7.8	-	8.9	-	-
LSD 5%	41								5	0.7				

1/-3/ - See footnotes - Table 5.

Table 11. Yield, tuber size, distribution, and quality characteristics of russet clones harvested 120 days after planting on Aroostook Farm, 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution				Rating Gv. 2/ 3/	Tuber 1/Sp. 2/Chip FF	2 mos. 1.0 Color 3/ FF	40°F Direct Chip FF	2 weeks 1.0 Color 3/ FF	40°F - 70°F Tex 3/ Chip FF Tex 3/ FF							
			1-7/8"		2-1/4"														
			1-7/8"	2-1/4"	3-1/4"	4"													
B8218-4	273	87	13	36	59	9	-	3	74	8.8	3.9	2.0	-						
B8528-3	238	81	19	53	46	1	-	2	77	7.8	3.0	2.1	-						
B8686-8	260	89	11	31	61	9	-	3	81	6.3	2.3	2.0	8.1						
B8697-29	216	83	17	46	49	4	-	2	64	8.9	3.8	2.2	6.9						
B8697-34	285	89	11	38	58	5	-	3	72	9.1	4.0	2.1	9.7						
B8704-5	202	85	15	32	64	4	-	2	79	7.6	3.1	2.1	9.9						
B8784-5	245	82	18	48	49	3	-	2	72	6.9	2.9	2.0	9.5						
B8822-9	281	81	19	49	41	10	-	2	71	7.9	3.2	2.3	4.5						
B8822-29	159	63	37	60	40	-	-	2	80	7.3	2.8	2.0	2.0						
B8822-37	274	78	22	62	36	2	-	3	82	8.3	3.5	1.9	-						
B8822-43	158	67	33	48	50	2	-	3	79	7.6	3.2	2.0	-						
B8848-2	339	95	5	22	67	8	2	3	75	8.2	3.5	2.0	-						
B8852-2	220	84	16	52	46	2	-	2	70	7.8	3.4	2.0	-						
B8881-5	245	79	21	70	27	3	-	2	70	7.2	2.1	2.0	-						
B8902-3	183	80	20	52	47	1	-	2	66	7.2	2.3	2.1	3.8						
Butte	135	53	47	71	29	-	-	1	60	6.7	2.3	2.3	3.4						
BelRus	228	80	20	55	41	4	-	3	78	7.2	2.5	2.0	4.2						
Russet	Burbank	327	84	16	38	54	8	-	1	79	8.1	3.3	2.0	-					
LSD 5%		46								3	0.7	0.6	0.2						

1/-3/ - See footnotes - Table 5.

Table 12. Yield, tuber size, distribution, and quality characteristics of russet clones harvested 120 days after planting on Aroostook Farm, 1979.

Pedigree	MKT Cwt	MKT % MKT	% Tuber Size Distribution			> 4"	Rating	Tuber ¹ /Sp. ² /Gv. ²	2 mos. ³ /FF	400F Direct Chip	400F 2 weeks ³ 1.0 Color ³ /FF	400F 2 weeks ³ 1.0 Color ³ /FF	FF Tex ³ /Chip	FF Tex ³ /Chip	FF Tex ³ /Chip			
			1-7/8"	2-1/4"	3-1/4"													
B7583-6	357	93	7	16	66	13	4	3	79	8.4	3.6	2.0	-	9.1	3.5	2.1		
B8934-4	325	91	9	32	61	6	1	2	72	7.3	2.2	2.0	4.7	2.0	8.9	3.5	2.2	
B8934-5	304	86	14	36	55	7	1	2	67	8.3	3.6	-	-	-	10.0	4.9	2.5	
B8937-9	262	71	29	65	35	-	-	2	66	8.7	3.7	2.4	-	-	9.7	4.8	2.8	
B8939-8	202	66	34	51	46	3	-	2	74	8.7	4.0	2.0	-	-	9.9	4.8	2.2	
B8939-17	212	77	23	46	54	-	-	2	71	7.0	2.8	1.9	9.4	4.2	2.3	9.7	4.4	
B8943-4	303	81	19	46	42	12	-	3	75	7.1	3.1	2.0	-	-	9.0	3.4	2.0	
B8966-3	212	79	21	47	49	4	-	2	67	7.0	2.7	2.0	9.1	4.3	2.2	9.0	3.8	
B8972-1	249	81	19	39	60	2	-	3	73	6.9	2.3	1.9	9.8	4.6	2.0	9.1	4.1	
B8977-2	428	91	9	24	67	9	-	2	67	8.3	4.3	2.2	-	-	9.7	4.0	2.1	
AKB8210-3	375	96	4	13	67	13	8	3	76	8.4	3.5	2.0	-	-	9.4	4.0	2.0	
BC8370-4	327	87	13	37	63	-	4	79	8.4	3.9	2.2	-	-	-	9.7	4.3	2.1	
BelRus	216	81	19	48	51	-	-	3	78	6.9	2.4	1.7	9.8	4.3	2.0	8.7	3.8	
Russet Burbank	383	87	13	32	53	15	1	1	77	8.2	3.4	2.0	-	-	-	8.3	4.2	2.1
LSD 5%								3	0.8	0.7	0.3							

1/-3/ See footnotes - Table 5.

Table 13. Yield, tuber size, distribution, and quality characteristics of round white clones harvested 120 days after planting (late maturity) on Aroostook Farm (Interregional - Florida, Virginia, New Jersey, Maine), 1979.

Pedigree	MKT CWT	%	% Tuber Size Distribution				Tuber Rating ^{1/}	Sp. 2/ Gv. 2/	50°F			40°F-70°F			
			1-7/8"- 2-1/4"		2-7/4"- 3-1/4"				2 mos. 1.0 Color ^{3/}		40°F Direct Chip		2 weeks 1.0 Color ^{3/}		
			MKT	<1-7/8"	MKT	<1-7/8"	MKT	<1-7/8"	MKT	<1-7/8"	MKT	<1-7/8"	MKT	<1-7/8"	
B6969-2	290	94	6	24	57	17	2	3	70	7.9	-	9.0	6.3	8.3	
B6987-184	273	92	8	8	61	14	1	2	89	7.6	9.1	9.3	-	9.1	
B7516-7	296	91	9	27	67	6	-	2	81	7.1	-	-	-	-	9.0
B7516-9	300	91	9	32	57	12	-	3	70	7.8	-	-	-	-	10.0
B8004-8	262	88	12	43	50	7	-	3	67	8.4	-	-	-	-	9.8
B8073-3	259	89	11	41	51	8	-	2	71	9.3	-	-	-	-	9.8
B8091-8	303	92	8	31	57	12	1	3	77	9.5	-	-	-	-	9.8
B8599-42	266	95	5	19	71	10	-	4	74	7.7	9.5	8.0	8.0	8.0	9.5
B8615-2	268	93	7	27	62	11	-	4	86	6.8	9.0	9.0	9.0	9.0	9.5
Atlantic	351	93	7	23	59	11	2	4	82	8.3	9.4	8.1	8.1	8.1	8.5
BelRus ^{4/}	202	84	16	56	27	16	-	3	84	7.6	-	-	-	-	9.7
Pungo	340	95	5	15	51	29	4	3	79	8.4	-	-	-	-	8.6
Superior	304	97	3	23	65	11	-	3	79	8.1	-	-	-	-	8.8
Sebago	273	92	8	42	52	5	-	2	71	7.8	-	-	-	-	9.1
Katahdin	296	94	6	19	59	13	-	3	72	8.2	-	-	-	-	9.1
LSD 5%	47							4		0.7					

^{1/3/} - See footnotes Table 5.

^{4/} - Russet

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

R. W. Ross and R. E. Hanneman, Jr.

Introduction of New Stocks. Sixty-three new stocks were received from four countries (Argentina, Bolivia, Chile, Netherlands). Fifteen were clonal selections of cultivated types, requested from the Netherlands. All others were true seeds of non-cultivated species donated by the collectors.

Preservation and Increase of Stocks. Approximately 90 percent of the introductions contained in the collection are maintained as true seed. Satisfactory seed increases of 213 species introductions and intraspecific hybrids were obtained under glass, fiberglass or screen. Recently-harvested seed samples of 196 species introductions were packaged for storage in the National Seed Storage Laboratory. Germination percentages of 1,450 seed lots of 2-20 years of age were determined.

Thirty-two introductions have been placed in meristem culture, 18 of which were heat treated. Eighteen clonal species introductions, 47 foreign varieties, 25 late blight differentials, and 148 meristem-culture plantlets were tested serologically for PVS and PVX using the latex agglutination technique. Twelve clonal species introductions and six late blight differentials were tested for PVY and PVA using the indicator plant, A-6. Fifty-two species introductions, 56 foreign varieties, 21 late blight differentials, 32 interspecific crosses, and 15 miscellaneous clones were tested for PSTV using polyacrylamide gel electrophoresis and of these 27 were found to be infected and were discarded.

Classification. Three hundred eighty-two herbarium specimens were collected and prepared from seedling populations of 108 Solanum accessions. More than 4,000 herbarium mounts representing specific and interspecific variability of 99 species are now available for taxonomic use.

Populations of nearly 40 interspecific crosses between Bolivian species were grown under screen to obtain the F_2 seed. This is a further effort to assist Solanum taxonomists attempting to solve the taxonomic problems posed by the Bolivian wild potato species.

Distribution of Stocks. Seed and tuber shipments were sent to potato workers in 17 states within this country and to those in 16 other countries. Shipments included 2,274 seed and 2,159 tuber samples of species introductions, and 5 seed and 241 tuber samples of germplasm developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project, involving species introductions.

Copies of a listing of 214 species introductions available in the form of tuber families (particularly for the benefit of potato projects without adequate green-house facilities) were distributed to 222 potato workers. This mailing elicited 21 responses that depleted most of the tuber families offered.

Evaluation of Stocks. The somatic chromosome numbers of 96 species introductions were determined in the laboratory.

The more-recent accessions are being steadily evaluated for characters of economic importance through the cooperative efforts of state, federal, and foreign laboratories.

Review of Project by Committee of Nine. The Committee of Nine met at Sturgeon Bay, Wisconsin in 1979, and reviewed the project on September 11th. Project personnel presented a progress report following a tour of the physical plant.

Usefulness of Findings. The major objective of the Potato Introduction Project is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germplasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Two new potato varieties, Delta Gold and Denali, were released for commercial production in 1978-1979. The number of foreign introductions entering into their pedigrees are five and ten respectively. One hundred forty-four of the 148 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties presently compose about 65 percent of the annual seed potato production in the United States.

Basic research programs conducted in several states and other countries continue to provide information concerning the potential value and diversity of the Solanum species, and consequently the knowledge necessary for more effective utilization of the IR-1 germplasm collection. Section six lists 30 papers, 18 abstracts, and 9 theses reporting the use of Solanum introductions.

NORTH CENTRAL REGIONAL POTATO TRIALS - 1979

R. H. Johansen and Cooperators ^{1/}

Potato Cultivar Trials

The North Central Regional Potato Cultivar Trials have been in existence since 1950. In 1979 13 States and 2 Provinces participated in the trials. The proposed participation of Kentucky in 1980 will make 16 locations this coming season. The trial in Louisiana was lost due to excessive flooding during 1979.

Recent Potato Cultivars.

<u>Progeny No.</u>	<u>Year Released</u>	<u>Released By</u>	<u>Released Name</u>	<u>Parentage</u>
MS 709	1978	Michigan St.Univ.	Michibonne	IA 902-3 x IA 872-4
MS 711-8	1978	Michigan St.Univ.	Michimac	IA 902-3 (x)
ND8888-2	1979	N.Dakota St.Univ.	Dakchip	Norchip X Cascade

Environmental Conditions. Soil type ranged from clay loam to coarse sand. The Indiana trial was a muck land.

Cultural Practices. Fertilizer, irrigation, insecticides, fungicides, vine killing, etc., were based on local conditions. Herbicides used were Eptam, Sencor, Lasso, Lorox, Dinitro and Maloran. The most popular fungicides were M45, Sulfur, Difolitan, Dithane, Manzate, Kocide, Mancozeb, Dithane and Bravo. Insecticides used were Sevimol, Methoxychlor, Thimet, Guthion, Pirimor, Sevin, Thiodan, Monitor, Temik, Lannate, Diazinon, Disyston and Thuricide.

<u>State or Province</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Alberta	5/16	9/17	125
Manitoba	6/1	9/26	118
Colorado	5/13	9/15	126
Indiana	5/17	10/17	142
Iowa	5/1	8/7	99
Kansas	3/30	8/7	131
Michigan	5/7	9/27	144
Minnesota	5/3	8/28	118
Missouri	4/18	8/22	127
Nebraska	5/25	9/18	117
North Dakota	5/23	9/17	118
Ohio	5/8	9/20	136
South Dakota	5/15	9/18	127
Wisconsin	5/8	9/24	140

1/ Indiana, H. Erickson; Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, F. Lauer; Missouri, V. Lambeth; Nebraska, R.O'Keefe; North Dakota, R.H. Johansen; Ohio, J. Pisarczyk; South Dakota, P. Prashar; Wisconsin, J. Schoenemann, D. Kichefski and S. Peloquin; USDA-R. Webb; Alaska C. Dearborn; Alberta, S. Molnar; Manitoba, W.A. Russell, USDA-Idaho, J. Pavek; Iowa, W. Summers; Colorado, C. Urano; Kentucky, J. Snyder; Michigan, R. Chase

Weather and Growing Conditions. For the most part the weather conditions in 1979 were quite cool at planting time and continued so after plant emergence. Conditions varied from location to location but for the most part ample moisture prevailed throughout the growing season, except for those locations which normally irrigate. The northern locations did not experience any extremely high prolonged temperatures during the growing season; however the southern states did have some high temperatures the latter part of the season. The plot in Louisiana was lost due to flooding which occurred shortly after planting. In Indiana it was cooler than normal during the growing season and quite dry at the end of the season. It was quite dry in Manitoba during August and September. Cool, wet weather in the spring caused the Kansas trial to emerge very slowly.

Entries. Wisconsin, Nebraska, North Dakota, Louisiana, Minnesota and Alaska all had entries in the 1979 trial. Red Pontiac, Norchip, Russet Burbank and Norland were the check cultivars and the seed was supplied by North Dakota. Minnesota did not have the Nebraska entries in their trial. Ohio did not report any data for Neb. A 129.69-1 and Neb. A69.72-1. Neb. 118 was entered in the Missouri and the two Canadian trials. Iowa did not report any data for Minn. 9648.

Total and U.S. No. 1 Yield are reported in North Central Tables 1 and 2. Missouri, Ohio, Wisconsin, Minnesota and Michigan reported the highest yields. Due to inclement weather conditions, Kansas and Manitoba reported the lowest yields.

Red Pontiac was again the top yielding entry for total yield, but was second to Neb. 51-3 in U.S. No. 1 yield. Other high yielding entries were Minn. 8777, Neb. A 129.69-1 and Norchip. Line ND137-2Russ had the lowest U.S. No. 1 yield.

Percent U.S. No. 1. Percent U.S. No. 1 is found in North Central Table 3. Several entries averaged above 80 percent U.S. No. 1 (Table 3). Russet Burbank, ND137-2Russ and Wisc. AS 17 all were 66 percent or lower for percent U.S. No. 1's. Growth cracking and second growth accounted for the low percent U.S. No. 1's of these three entries

Maturity. Line ND146-4R and Norland were the earliest maturing selections (North Central Table 4). Line AK 38-2 was the latest maturing selections. Other late maturing entries were Russet Burbank, La. 42-38, Neb. A129.69-1 and Neb. 51-3.

Percent Total Solids. Percent total solids are found in North Central Table 5. Line AK38-2 produced the highest percent total solids. Others having an average total solids above 20 percent were Wisc. 738, Wisc. 723 and Minn. 8224. Norland Wisc. AS 17 and Red Pontiac produced the lowest percent total solids

Scab Reaction. The incidence of scab seemed to be the highest in Nebraska, Kansas and Indiana (North Central Table 6). Several States and Provinces reported little or no scab.

Summary of Grade Defects. Grade defects are found in North Central Table 7. To point out weaknesses of certain advanced selections some are starred. This is done mainly to point out that weakness to the person responsible for that

particular selection or cultivar. He in turn will have to decide whether he wants to discard the selection or not. Line AK 38-2 showed a high percent of external and internal defects as did Neb. 51-3. Growth cracks, second growth and sun greening were the main defects of these two selections. Russet Burbank again showed an incidence of second growth.

Chip Quality. Several selections including Ak 38-2, Minn. 8224 and Minn. 9648 and Wisc. 723 were quite comparable to Norchip in chip color. Agtron and color chart readings for chip color are found in North Central Table 8.

Overall Merit Ratings. Merit ratings are presented for 1977, 1978 and 1979. Complete merit ratings for the North Central Trial are found in North Central Table 9.

<u>Cultivar or Selection</u>	<u>Total Points</u>		
	<u>1977</u>	<u>1978</u>	<u>1979</u>
Minn. 8777			35
Neb. A129.69-1			29
ND146-4R			24
Norchip	23	26	20
Wisc. 723	13	19	19

1/ Merit Ratings

<u>Ratings</u>	<u>Points</u>
1	5
2	4
3	3
4	2
5	1

North Central Table 1. 1979 North Central Regional Trial Total Yield (cwt/acre)

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Ave
<u>Early to Med. Early</u>															
ND146-4R	439	170	207	345	371	138	343	375	314	244	269	300	141	434	292
<u>Norland</u>	422	157	362	344	343	177	400	380	322	324	219	395	123	408	313
<u>Medium to Late</u>															
<i>Norchip</i>	347	174	357	349	376	262	363	360	408	289	237	465	190	487	333
<i>Minn. 8224</i>	291	56	300	233	308	148	324	401	301	220	174	303	62	315	246
<i>Minn. 8777</i>	234	147	385	471	416	247	643	419	498	318	191	531	132	704	381
<i>Minn. 9648</i>	262	131	332	202	130	256	314	368	236	157	427	109	443	259	21
<i>Wisc. 723</i>	384	135	194	290	337	248	324	327	350	248	194	360	104	517	287
<i>Wisc. 738</i>	275	128	354	344	342	218	361	359	353	283	143	434	112	556	304
<i>Wisc. AS-17</i>	260	153	269	238	412	273	404	528	419	290	272	425	126	581	332
<i>Neb. A69.72-1</i>	255	119	309	296	321	158	353	376	203	204	136	497	136	497	1/
<i>Neb. 51-3</i>	336	151	412	320	283	236	508	533	268	206	633	249	704	372	2/
<i>Neb. A129.69-1</i>	216	134	327	360	355	269	399	446	308	199	237	553	317	553	1/
<i>AK 38-2</i>	282	152	358	451	341	206	420	316	423	274	181	354	260	491	322
<i>La. 42-38</i>	223	130	201	467	415	258	307	423	456	190	217	429	104	468	278
<i>ND137-2RUSS</i>	313	118	243	181	254	154	236	319	326	201	200	318	102	330	235
<i>Red Pontiac</i>	433	194	273	502	465	304	685	455	560	376	238	588	248	659	427
<i>Russet Burbank</i>	300	159	382	327	342	248	463	368	466	328	150	466	161	589	339
<i>Neb. 118</i>	340	144										369		284	
<i>AVERAGE</i>	312	142	310	336	355	216	399	382	405	255	203	429	153	514	311

$\frac{1}{2}/$ Average - 12 locations
 $\frac{1}{2}/$ Average - 13 locations

North Central Table 2. 1979 North Central Regional trial - U.S. No. 1 Yield (cwt/acre)

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wis.	Ave.
<u>Early to Medium Early</u>															
ND146-4R	381	155	140	218	219	79	331	357	294	200	229	261	125	408	243
Norland	336	142	286	220	212	112	395	359	323	249	159	345	112	400	257
<u>Medium to Late</u>															
Norchip	242	152	275	218	207	163	351	343	393	189	193	417	176	474	271
Minn. 8224	217	44	243	156	170	53	311	355	289	147	143	273	52	294	196
Minn. 8777	162	133	322	379	319	145	637	408	464	182	163	50	118	695	298
Minn. 9648	206	113	266	157	75	250	299	350	350	150	123	386	103	432	224
Wisc. 723	319	119	143	236	248	155	319	309	331	158	184	329	91	509	246
Wisc. 738	210	112	268	276	240	117	354	338	340	190	125	377	104	550	257
Wisc. AS-17	165	107	134	117	148	20	381	449	367	105	228	332	83	528	226
Neb. A69.72-1	193	108	250	257	268	106	347	366	105	172	130	492	233	1/	271
Neb. 51-3	256	136	300	268	166	118	497	505	132	131	571	234	695	466	2/
Neb. A19.69-1	177	120	284	295	271	155	391	418	247	176	208	545	274	1/	
AK 38-2	186	134	243	381	234	91	411	305	394	136	150	279	237	480	262
La. 42-38	160	118	173	412	310	136	303	391	419	121	185	382	94	459	262
ND137-2Russ	139	78	130	87	122	27	221	278	247	79	92	240	68	303	151
Red Pontiac	362	182	183	428	316	163	675	446	543	190	220	507	231	650	364
Russet Burbank	159	127	99	242	159	112	450	352	400	40	89	291	139	567	230
Neb. 118	290	128													257
AVERAGE	231	123	220	256	226	107	390	356	373	154	163	336	136	499	262

North Central Table 3. Average Percent U.S. No. 1 over 2" diameter.

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Ave.
<u>Early to Med. Early</u>															
ND146-4R	86	91	68	63	59	57	97	95	94	82	89	87	89	94	84
Norland	79	90	80	68	62	63	99	95	97	77	72	87	91	98	83
<u>Medium to Late</u>															
Norchip	69	87	77	62	55	62	97	95	96	65	83	90	93	97	81
Minn. 8224	74	79	81	68	55	36	96	89	96	67	82	90	84	94	78
Minn. 8777	69	91	83	81	77	59	99	97	93	57	85	94	90	99	84
Minn. 9648	78	86	80	78	58	98	95	95	95	64	77	90	94	98	84
Wisc. 723	83	88	73	82	74	63	98	95	95	64	94	91	88	98	84
Wisc. 738	76	87	76	80	70	54	98	94	96	67	87	87	94	99	83
Wisc. AS-17	63	70	50	49	36	7	94	85	88	36	84	78	66	91	64
Neb. A69-72-1	75	91	80	87	83	67	98	97	52	84	95	99	95	99	84 1/2/
Neb. 51-3	76	90	72	84	59	50	98	95	50	63	90	94	99	99	78 1/2/
Neb. A129-69-1	82	89	86	82	76	58	98	94	80	88	88	88	99	99	85 1/2/
AK 38-2	66	88	67	84	69	44	98	96	93	50	83	79	91	99	79
La. 42-38	72	90	86	88	75	53	99	92	92	64	85	89	91	98	84
ND137-2Russ	44	67	54	48	48	18	94	87	76	40	45	75	67	92	61
Red Pontiac	83	94	66	85	68	54	99	98	97	51	92	86	93	99	83
Russet Burbank	53	80	26	74	46	45	97	96	86	12	59	62	86	96	66
Neb. 118	85	88						96						90	
AVERAGE	73	86	73	74	63	50	98	94	93	57	80	85	88	97	80

$\frac{1}{2}/$ Average - 12 locations
 $\frac{2}{3}/$ Average - 13 locations

North Central Table 4. Maturity Classification^{1/}

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wis. ^c	Ave.
Early to Med. Early															
ND146-4R	1.5	1.8	1.0	1.5	1.0	1.3	1.0	1.0	1.5	1.0	2.3	1.0	1.0	1.0	1.27
<hr/>															
Norland	2.5	1.0	1.0	1.1	1.0	2.0	1.0	1.8	1.5	1.0	2.0	1.0	1.0	1.0	1.35
<hr/>															
Medium to Late															
Norchip	3.0	2.8	3.0	2.8	2.0	4.0	2.0	2.3	3.5	3.0	3.0	2.0	3.0	2.0	2.74
Minn. 8224	2.5	3.0	3.0	2.7	2.0	4.3	3.0	2.0	3.0	3.0	3.8	2.0	3.0	2.0	2.85
Minn. 8777	4.5	3.8	4.0	3.4	4.0	4.8	5.0	1.0	5.0	4.0	4.5	3.0	3.0	5.0	3.92
Minn. 9648	2.5	2.5	2.0	2.2	3.0	2.0	1.2	3.5	2.0	4.3	3.0	2.0	3.0	3.0	2.55
Wisc. 723	2.0	2.9	3.0	3.4	3.0	4.3	3.0	2.0	3.5	3.0	3.3	3.0	4.0	4.0	3.18
Wisc. 738	2.5	3.3	4.0	4.0	3.0	4.8	4.0	2.0	4.0	4.0	4.3	3.0	4.0	5.0	3.71
Wisc. AS-17	2.5	3.1	2.0	3.1	2.0	4.3	3.0	2.0	2.5	2.0	3.4	3.0	2.0	3.0	2.69
Neb. A69.72-1	4.5	3.8	3.0	4.4	3.0	4.8	3.0	2.5	3.0	4.0	4.0	4.0	5.0	5.0	3.75 ^{2/}
Neb. 51-3	3.5	3.9	3.0	4.0	5.0	4.3	4.0	4.0	3.0	4.0	5.0	5.0	5.0	5.0	4.13 ^{3/}
Neb. A129.69-1	3.5	3.8	4.0	4.2	5.0	4.3	3.0	4.5	4.0	4.1	5.0	5.0	5.0	5.0	4.20 ^{2/}
AK 38-2	4.5	3.2	4.0	4.5	5.0	4.5	5.0	3.8	4.5	4.0	3.8	4.0	5.0	5.0	4.34
La. 42-38	2.0	3.8	5.0	4.1	4.0	4.5	4.0	2.5	4.5	5.0	4.0	4.0	4.0	4.0	4.02
ND137-2Russ	3.5	2.1	2.0	2.6	2.0	2.8	2.0	2.0	2.5	2.0	3.0	2.0	2.0	3.0	2.35
Red Pontiac	4.5	3.4	4.0	4.2	3.0	4.5	3.0	2.8	3.5	4.0	4.0	3.0	3.0	4.0	3.64
Russet Burbank	4.5	4.0	4.0	4.4	3.0	5.0	4.0	3.5	5.0	4.0	4.5	5.0	4.0	4.0	4.21
Neb. 118	3.5	3.5						3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.00
<hr/>															
AVERAGE	3.19	3.09	3.06	3.33	3.00	3.97	3.00	2.14	3.47	3.50	3.66	3.00	3.24	3.59	3.22

^{1/} 1. Very Early - Norland Maturity
 2. Early - Irish Cobbler Maturity
 3. Medium - Red Pontiac Maturity
 4. Late - Katahdin Maturity
 5. Very Late - Russet Burbank Maturity

^{2/} Average - 12 locations
^{3/} Average - 13 locations

North Central Table 5. Percent Total Solids.

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wis. C.	Ave.
Early to Med. Early															
ND146-4R	20.0	19.6	17.1	15.7	16.0	17.8	15.5	18.0	17.5	20.3	15.4	18.2	16.5	17.6	
Norland	17.3	18.5	16.0	14.7	14.1	14.8	14.7	16.8	16.9	19.7	14.3	17.7	15.4	16.1	
<hr/>															
Medium to Late															
Norchip	20.5	21.4	20.3	17.9	18.2	19.2	20.2	20.3	19.7	22.0	17.1	21.2	19.4	19.8	
Minn. 8224	21.5	20.4	21.8	19.1	18.2	20.6	22.7	20.5	21.2	22.4	18.6	21.9	18.6	20.4	
Minn. 8777	18.8	19.9	20.0	15.9	16.7	17.2	18.2	18.6	18.2	19.4	16.2	18.0	16.9	18.0 ²	
Minn. 9648	21.5	21.7	17.5	15.9	16.8	17.2	18.7	19.0	18.8	19.9	16.5	19.4	17.1	18.5 ¹	
Wisc. 723	21.5	21.1	20.5	19.1	18.8	19.8	20.0	20.6	19.0	20.1	22.9	17.5	21.5	21.2	
Wisc. 738	20.5	22.5	21.4	18.6	19.0	19.0	20.4	20.4	20.5	20.7	20.9	18.0	20.9	20.7	
Wisc. AS-17	18.2	18.4	16.2	14.9	15.0	15.5	15.3	18.0	15.6	15.8	19.4	15.4	16.6	16.9	
Neb. A69.72-1	21.0	19.6	17.3	17.9	17.5	15.9	18.4	18.0	18.2	20.5	20.6	18.4	18.4	18.6 ¹	
Neb. 51-3	19.0	18.8	17.3	15.7	15.8	15.0	16.9	16.9	17.7	17.5	14.3	20.0	16.9	17.1 ²	
Neb. A129.69-1	20.8	20.3	19.0	17.2	17.1	17.9	18.8	18.0	20.1	19.2	20.1	19.9	19.0	19.0 ²	
AK38-2	24.0	23.6	20.7	19.5	20.1	18.3	22.1	20.3	20.1	21.6	22.4	16.5	21.7	20.8	
La. 42-38	20.8	20.5	18.6	18.9	18.4	18.3	19.5	20.3	19.0	18.6	21.6	17.7	19.4	18.6	
ND137-2RUSS	19.3	19.2	16.0	14.9	15.0	17.9	15.2	17.5	17.7	17.1	18.8	16.0	20.5	15.4	
Red Pontiac	-	18.3	19.2	16.2	15.9	14.5	15.9	16.5	16.4	14.8	16.5	19.7	15.4	16.7	
Russet Burbank	20.8	22.5	18.2	18.4	18.8	17.2	20.2	22.0	19.2	16.2	19.9	18.4	21.9	20.3	
Neb. 118	21.3	19.5													
<hr/>															
AVERAGE		20.2	20.3	18.4	17.1	17.2	17.4	18.0	19.3	18.3	18.4	20.4	16.4	19.7	18.1

1/ Average - 12 locations
2/ Average - 13 locations

AVERAGE 20.2 20.3 18.4 17.1 17.2 17.4 18.0 19.3 18.3 18.4 20.4 16.4 19.7 18.1 18.6

North Central Table 6. Scab Reaction Report. Most representative scab (area-type) 1/

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn <u>2/</u>	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.
<u>Early to Med. Early</u>														
NDL 46-4R	T-1		T-2		T-1		T-1	T-1		1-1	1-3	T-1		
Norland	1-2	1-2	1-1	T-1	1-1		1-2	T-1	1-3	T-2				
<u>Medium to Late</u>														
Norchip	2-1			T-1		2-1	1-2		T-1	2-5	T-2			
Minn. 8224	T-4	1-1	2-1	1-2	2-1	1-1	1-1	1-1	1-3	3-3	1-1			
Minn. 8777	1-1	1-1	2-4	1-3	4-1	1-2	1-2	1-2	1-3	3-3				2-4
Minn. 9648	1-1	1-2	T-3	T-1	1-1	T-1	2-1	2-2	1-2	0-0	1-1			
Wisc. 723	1-1	1-2	1-2	T-1	1-1	1-1	1-1	1-1	1-3	T-1				
Wisc. 738	1-1	1-2	1-2	T-1	2-1	T-1	1-2	1-2	2-3	3-2	1-1			
Wisc. AS-17	T-1	1-1	2-2	T-1	1-1	T-1	1-1	1-1	1-5	T-1	1-1			
Neb. A69.72-1	1-3	2-2	T-1	1-1	1-1	1-1	1-1	1-1	1-3	0-0				
Neb. 51-3	1-1	2-1	T-1	3-1	1-1	T-1	1-1	1-1	1-2	T-1				
Neb. A129.69-1	1-1	1-1	T-1	5-2	T-1	1-1	1-1	1-1	2-2	2-2				
AK 38-2	1-2	1-3	T-1	3-1	1-2	1-2	1-2	1-1	1-4	T-1				
La. 42-38	1-2			T-1	2-1	0-0			1-1	1-3	T-1			
NDL 37-2 Russ	1-3		2-3		T-1	1-1	1-3		1-2	1-2	0-0			
Red Pontiac	1-1			3-1	T-1	3-1	1-2	1-1	3-5	1-2	1-1			2-4
Russet Burbank				3-1	T-1	1-1	1-1	1-1	1-2	0-0				
Neb. 118			2-1					T-1	1-3					

1/ AREA

T = less than 1%
 1 = 1-20%
 2 = 21-40%
 3 = 41-60%
 4 = 61-80%
 5 = 81-100%

2/ No data

TYPE

1. Small, superficial
2. Larger, superficial
3. Larger, rough pustules
4. Larger pustules, shallow holes
5. Very large pustules, deep holes

North Central Table 7. Summary of Grade Defects

Cultivar	External						Internal																	
	Scab			Growth Cracks			Second Growth			Sun Green			Total Free of <u>1/</u>	Ext.	Defects									
	Early	to	Med.	Early	to	Med.	Ext.	to	Med.	Ext.	Defects	Ext.	Defects	Ext.	Defects	Ext.	Defects	Ext.	Defects	Ext.	Defects	Ext.	Defects	
NDL46-4R	16.7		2.1	2.0		0.7	86.1		0.1	0.0		2.2		96.5										
Norland	19.1		3.6	5.4		3.0	78.4		0.6	0.5		1.7		97.2										
<u>Medium to Late</u>																								
Norchip	17.4		7.0*	7.4		3.6	73.4		0.4	0.3		3.3		6.4										
Minn. 8224	24.8*		2.4	5.6		3.0	74.4		0.9	0.9		8.4*		90.1										
Minn. 8777	17.8		2.2	3.6		0.7	83.1		1.0	4.6*		9.4*		85.8										
Minn. 9648	15.3		3.7	8.2*		1.2	80.1		1.0	0.2		7.3		92.4										
Wisc. 723	17.6		1.6	6.9		3.6	79.2		0.3	0.2		5.9		93.6										
Wisc. 738	21.9		1.1	2.9		4.5	78.8		2.9	2.0		5.9		89.6										
Wisc. AS-17	17.3		0.1	2.8		1.7	85.8		0.1	0.1		5.1		94.2										
Neb. A69.72-1	22.7		5.0	8.8*		0.9	72.4		1.9	0.5		9.3*		87.5										
Neb. 5L-3	15.9		8.9*	8.9*		10.1*	66.9		1.8	2.5		7.5		88.7										
Neb. A129.69-1	23.6		0.9	3.3		3.8	77.7		1.8	0.3		4.8		93.2										
AK 38-2	17.7		4.9	16.6*		6.0*	69.5		10.1*	4.5*		12.3*		74.2										
La. 42-38	13.3		3.6	6.9		3.3	81.4		4.6	0.1		2.6		93.1										
NDL37-2RUSS	19.1		18.9*	6.5		0.2	66.6		1.2	0.3		1.8		96.6										
Red Pontiac	24.4*		1.8	7.3		1.7	72.9		2.1	0.5		3.1		94.4										
Russet Burbank	10.7		4.3	26.8*		3.2	64.9		3.1	2.7		4.8		90.0										
AVERAGE	18.6		4.2	7.6		3.0	76.0		2.0	1.4		5.8		91.0										
<u>1/ Percent normal tubers showing no defects (some individuals had more than one type of defect)</u>																								

*Possible weakness of cultivar or clone.

North Central Table 8. Chip Quality

Cultivar	Early to Med. Early	1/ Alb.	Manit.	Colo.	1/ Ind.	Iowa	Kansas	Mich.	1/ Minn.	2/ Mo.	Neb.	1/ N.D.	2/ Ohio	1/ Wisconsin
NDL 46-4R	4.0	1.0	4.0		2.0	50		2.0	34	60				5.5
Norland	5.7	3.0	5.0		2.0	31		4.0	34	57				6.4
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Medium to Late														
Norchip	3.3	1.0	3.0		1.0	47		3.0	39	56				4.9
Minn. 8224	3.8	1.0	2.0		1.0	51		3.0	31	66				4.3
Minn. 8777	6.0	3.0	6.0		2.0	30		7.0	18	49				9.0
Minn. 9648	6.3	2.0	2.0		1.0	49		3.0	24	58				4.9
Wisc. 723	4.6	2.0	3.0		3.0	40		3.0	27	61				5.5
Wisc. 738	5.5	2.0	5.0		2.0	44		3.0	29	57				7.3
Wisc. AS-17	6.2	2.0	5.0		2.0	45		3.0	28	59				6.2
Neb. A69.72-1	7.0	5.0	6.0		3.0			5.0	20					9.0
Neb. 51-3	8.3	4.0	5.0		4.0			7.0	14	40				8.0
Neb. A129.69-1	5.7	2.0	3.0		3.0			4.0	18					7.0
AK 38-2	3.8	1.0	5.0		2.0	50		3.0	35	56				6.4
La. 42-38	7.5	2.0	4.0		3.0	40		4.0	25	52				7.5
NDL 37-2RUSS	8.2	6.0	7.0		4.0	29		6.0	17	56				8.0
Red Pontiac	9.0	6.0	9.0		4.0	33		5.0	20	45				9.0
Russet Burbank	4.7	4.0	6.0		3.0	36		4.0	19	50				6.9
Neb. 118	5.3													
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AVERAGE	5.8	2.8	4.7		2.5	41.0		4.1	25.4	54.8				6.8

North Central Table 9. Merit Ratings^{1/}

Cultivar	Alb.	Manit.	Colo.	Ind.	Iowa	Kansas	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Total Points
<u>Early to Med. Early</u>															24
ND146-4R	4	4		2				5	3					2	24
Norland	1	1		4				3							14
<u>Medium to Late</u>															20
Norchip	5		3					4	2					1	8
Minn. 8224		5						2	1						8
Minn. 8777		2	4					3	4					3	35
Minn. 9648								5	5	4				4	4
Wisc. 723	5							5	1	3				4	19
Wisc. 738		3	3					5	5					5	15
Wisc. AS-17								2	2	4				1	7
Neb. A69-72-1				2											2
Neb. 51-3		1						2	2	4					2
Neb. A129-69-1		4	5	5										3	9
AK 38-2														5	5
La. 42-38			1												3
ND137-2Russ															
Red Pontiac	2	2						1	1						9
Russet Burbank		3								1					4
Neb. 118	3														3
<u>TOTAL</u>															210
<u>1/ Merit Ratings</u>															
Rating		Points													
1		5													
2		4													
3		3													
4		2													
5		1													

Project Number and Title: 2201. Breeding Potatoes for North Dakota

Personnel and Cooperation: Robert H. Johansen, Leader; Bryce Farnsworth, E. P. Lana, D. C. Nelson, Gary Secor and Phil Nolte

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North Dakota Certified Seed Growers

Red River Valley Potato Growers Association, East Grand Forks, MN

Campbell Soup Company, Camden, New Jersey

Frito-Lay Inc., Dallas, Texas

Pillsbury Company, Grand Forks, ND

Ron Voss - University of California, Davis, CA

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Joseph Pavek - USDA, Aberdeen, Idaho

Charles Dunn - Homestead, Florida

Objectives:

1. To develop improved potato cultivars that are productive and have smooth tuber type.
2. To develop improved potato cultivars that have resistance to certain diseases and insects.
3. To develop improved potato cultivars that have bright red skin color and resistance to silver scurf.
4. To develop improved potato cultivars that have long tuber type and uniformly russeted skin.
5. To develop improved white cultivars that have superior chipping and processing qualities.
6. To develop improved widely adapted cultivars that have a seed demand in other potato producing areas.
7. To develop improved potato cultivars that have high total solids and good table quality.

WESTERN REGIONAL POTATO VARIETY TRIAL - 1979

J. J. Pavek, D. L. Corsini, and Cooperators^{1/}

The 1979 Western regional uniform potato variety trial was grown at 12 locations in seven states and one Canadian province. The trial consisted of 14 entries including 10 experimental clones, two (NDA8694-3, NDA9249-3) intended for early harvest. The trial locations, planting and harvest dates, and days from planting to harvest were as follows:

State/ Province	Location	Planted Date	Harvest Date	Days To Harvest
Alberta	Brooks	5/17	9/17	123
California	Kern County	2/28	6/25	117
"	Tulelake	5/16	10/11	148
Colorado	San Luis Valley	5/23	9/24	124
Idaho	Aberdeen (Early)	4/30	8/20	112
"	" (Late)	5/1	9/24	146
"	Kimberly	4/26	10/4	161
Oregon	Hermiston	4/18	9/25	161
"	Malheur County (Early)	4/20	8/8	110
"	" (Late)	4/20	10/16	179
Washington	Othello	4/26	9/12	139
"	Paterson	4/9	9/25	169
Wyoming	Torrington	5/23	10/18	148
Texas	Lubbock	No report		

Fertilizer, insecticide, and herbicide application varied according to local condition, as did irrigation and vine killing. Rainfall was insignificant during the growing period throughout the entire region. Temperatures were very hot (up to 114° F) in Kern County in May. And they were generally high in the rest of the region during the first half of the season and moderated thereafter. At most locations vines were killed prior to harvest because of delayed frost. They were beat off in Kern County and for the early harvests in Idaho and Oregon. Data on maturity, yields, specific gravity, scab, and hollow heart are presented in Western Tables 1 through 8. Experimental clones to be retained in the 1980 trial are AC67560-1, WC521-12, and WC612-13. Release of A68678-1 as 'Lemhi Russet' is planned for 1980.

^{1/} Alberta, D. Lynch; California, R. Voss; Colorado, J. Twomey; Idaho, G. Kleinschmidt, S. Michener; Oregon, A. Mosley, M. Johnson, C. Stanger, G. Carter; Washington, M. Martin, W. Iritani, N. Holsted; Wyoming, K. Bohnenblust; Texas, J. C. Miller, Jr., D. Smallwood.

Western Table 1. Maturity (Vine) classification^{1/}.

Variety	California (Kern) (TL)	Colo	Idaho (Ab) (Kim)	Oregon (Herm) (Mal)	Washington (0th) (Pat)	Wyo	Alb	Mean
A66102-16	3.0	2.0	4.0	3.8	N.R. ^{2/}	3.0	3.5	3.0
A66122-3	5.0	4.0	-	3.6	"	1.0	4.0	2.0
A68678-1	3.0	3.0	4.0	3.3	"	2.5	3.0	4.0
A70365-27	3.0	2.5	4.0	3.3	"	3.5	4.0	3.0
AC67560-1	3.0	2.5	3.0	2.2	"	1.0	2.0	1.0
B7024-81	3.0	2.5	4.0	2.4	"	1.0	1.0	1.0
WC521-14	3.5	3.0	-	3.3	"	5.0	3.0	3.0
WC612-13	3.5	3.5	-	3.9	"	3.5	3.5	4.0
Butte	3.5	4.0	4.0	2.9	"	3.5	4.0	3.0
Russet Burbank	3.5	3.5	4.0	3.1	"	2.0	4.0	2.0
Atlantic	3.0	3.0	-	3.0	"	2.5	3.5	1.0
Norgold	2.0	1.5	-	2.3	"	2.0	-	1.0
NDA8694-3	2.5	2.0	-	2.8	"	2.5	1.0	1.0
NDA9249-3	2.5	2.0	-	2.5	"	3.0	1.5	1.0

^{1/} 1 = earliest to 5 = latest.

^{2/} N.R. = Not recorded.

Western Table 2. Total Yield cwt/acre.

Variety	California (Kern) (TL)		Colo (Ab)		Idaho (Kim)		Oregon (Herm)		Washington (0th)		Wyo (Pat)		Alb		Mean
	Calif	Colo	Calif	Idaho	Oregon	Oregon	Wyo	Alb							
A66102-16	470	715	283	492	253	516	493	346	816	261	284	448	bc	—	—
A66122-3	375	615	—	535	330	585	408	567	1,011	286	374	495	ab	—	—
A68678-1	495	665	318	509	346	582	528	419	974	339	309	499	ab	—	—
A70365-27	350	725	264	407	219	411	421	293	723	177	153	377	d	—	—
AC67560-1	355	440	246	530	292	440	395	440	856	327	264	417	cd	—	—
B7024-81	580	415	255	409	237	379	434	260	882	284	247	398	cd	—	—
WC521-12	540	590	—	372	294	535	553	303	917	235	—	454	bc	—	—
WC612-13	350	470	—	643	385	516	526	606	1,048	344	—	508	ab	—	—
Butte	475	730	136	512	333	412	441	413	798	317	274	440	bc	—	—
Russet Burbank	500	555	305	554	283	480	513	520	1,118	326	263	493	ab	—	—
Atlantic	590	785	—	570	—	540	400	456	874	310	361	543	a	—	—
Norgold	490	410	—	430	—	348	348	—	470	261	408	384	cd	—	—
NDA8694-3	385	285	—	424	—	356	496	213	653	245	361	380	cd	—	—
NDA9249-3	340	380	—	415	—	421	402	270	973	299	—	432	bcd	—	—
Location Means	450	556	284	486	297	466	454	392	864	287	311	448			

¹/Means followed by same letter do not differ significantly at the 5% level (Duncan's multiple range test) using locations as reps.

Western Table 3. Yield, U.S. #1's cwt/acre & %.

Variety	California (Kern) (TL)				Colo				Idaho (Ab) (Kim)				Oregon (Hern) (Mal)				Washington (0th) (Pat)				Wyo.				Alb.			
	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%	cwt	%
A66102-16	270	50	505	71	155	55	404	82	189	75	371	72	372	75	266	77	488	60	202	77	215	76	312	70				
A66122-3	325	87	485	79	-		312	58	221	67	404	69	294	72	439	77	484	48	187	65	247	66	329	66				
A68678-1	435	88	580	87	223	70	438	86	251	73	512	88	466	88	331	79	689	71	267	79	205	66	400	80				
A70365-27	310	89	590	81	155	59	327	80	134	61	281	68	358	85	206	70	525	73	131	74	91	59	283	75				
AC67560-1	320	90	375	85	184	75	474	89	202	69	388	88	334	85	400	91	678	79	270	83	215	59	349	84				
B7024-81	535	92	335	81	170	67	337	82	188	79	326	86	381	88	197	76	618	70	221	79	165	67	316	79				
WC521-12	510	94	520	88	-		327	88	221	75	496	93	496	90	200	66	779	85	195	83	-		389	86				
WC612-13	300	86	405	86	-		552	86	294	76	469	91	486	92	490	81	859	82	285	83	-		427	85				
Butte	370	78	640	88	102	75	444	87	257	77	278	67	345	78	280	68	537	67	228	72	191	70	334	76				
Russet B.	340	68	420	76	159	52	358	65	175	62	246	51	404	79	403	78	461	41	209	64	172	65	304	62				
Atlantic	555	94	735	94	-		470	82	-		493	91	357	89	390	86	613	70	293	95	274	76	464	85				
Norgold	445	91	315	77	-		376	87	-		306	88	294	84	-		350	74	204	78	312	76	316	82				
NDA8694-3	350	91	245	86	-		364	86	-		317	89	441	89	153	72	479	73	205	85	275	76	314	83				
NDA9249-3	280	82	275	72	-		348	84	-		364	86	352	88	210	78	629	65	179	60	-		323	75				
Location Means	382	85	459	83	189	67	395	81	213	72	375	80	385	85	304	78	585	68	220	77	227	73	347	77				

Western Table 4. U.S. #1's over 10 or 12 oz., percent.

Variety	California (Kern)	Colo (TL)	Idaho (Ab)	Oregon (Herm)	Washington (0thn)	Wyo (Pat)	Alb	Mean Percent ^{1/}
A66102-16	12	43	5	46	30	N.R.	40	18
A66122-3	3	47	-	26	22	"	38	30
A68678-1	7	44	21	54	19	"	56	12
A70365-27	9	51	9	37	6	"	54	44
AC67560-1	7	32	11	40	79	"	34	29
B7024-81	15	42	7	23	16	"	43	17
WC521-12	28	63	-	51	30	"	66	17
WC612-13	4	39	-	40	27	"	60	25
Butte	1	39	13	35	13	"	44	20
Russet Burbank	2	27	11	27	7	"	34	22
Atlantic	9	45	-	9	-	"	35	26
Norgold	22	35	-	10	-	"	37	-
NDA8694-3	4	19	-	6	-	"	60	3
NDA9249-3	25	47	-	13	-	"	60	36
							50	50
							41	41

^{1/} Colorado data omitted.

Western Table 5. Specific Gravity.

Variety	California (Kern) (TL)	Colo (Ab)	Idaho (Kim)	Oregon (Herm) (Mal)	Washington (0th) (Pat)	Wyo	Alb	Mean ^{1/}
A66102-16	1.085	1.086	1.090	1.080	1.079	1.088	1.094	1.084
A66122-3	79	78	-	72	71	77	75	71
A68678-1	91	87	86	85	87	95	78	84
A70365-27	86	76	78	84	82	85	96	81
AC67560-1	76	86	67	63	61	70	71	65
B7024-81	86	85	91	86	93	92	102	93
WC521-12	99	94	-	94	90	98	105	94
WC612-13	89	88	-	83	84	83	96	94
Butte	86	84	79	76	79	86	102	78
Russet Burbank	84	92	81	75	71	81	82	84
Atlantic	94	90	-	82	-	90	98	99
Norgold	79	73	-	66	-	75	85	-
NDA8694-3	75	66	-	68	-	75	84	65
NDA9249-3	80	72	-	63	-	79	88	76
Location Means	85	83	83	77	80	83	91	82

^{1/}Means followed by the same letter do not differ significantly at the 5% level (Duncan's multiple range test) using locations as reps.

^{1/}Means followed by the same letter do not differ significantly at the 5% level (Duncan's multiple range test) using locations as reps.

Western Table 6. Common Scab.

Variety	California (Kern) (TL)	Colo (Ab)	Idaho (Kim)	Oregon (Herm)	Washington (0th)	Washington (Pat)	Wyo	Alb	Mean ^{2/}
A66102-16	0	0	1	1	2	0	0	2	1.0
A66122-3	0	0	-	0	0	0	2	"	0.3
A68678-1	0	0	0	0	1	0	0	1	0.3
A70365-27	0	0	0	1	0	0	0	3	0.7
AC67560-1	0	0	0	1	2	3	0	2	0
B7024-81	0	0	-	2	3	2	0	3	2.0
WC521-12	0	0	-	4	2	0	0	2	-
WC612-13	0	0	-	4	2	1	0	3	1.3
Butte	0	0	0	1	0	1	0	2	0.7
Russet Burbank	0	0	0	1	0	1	0	1	0.5
Atlantic	0	0	-	2	-	0	0	2	-
Norgold	0	0	-	0	-	0	0	1	0.3
NDA8694-3	0	0	-	1	-	2	0	2	1.0
NDA9249-3	0	0	-	1	-	1	0	3	1.0

1/ 0 (none) to 5 (most severe).

2/ Mean of locations with significant scab problems (Aberdeen, Kimberly, Hermiston, Othello, Paterson).

Western Table 7. Hollow Heart, Percent of Large Tubers (>10 or >12 oz) or of Random Sample.

Variety	California (Kern) >12 oz			Colo >10 oz			Idaho (Ab) >10 oz			Oregon (Herm) random >10 oz			Washington (Mal) (0th) random			Wyoming (Pat) random			Alb			Mean
	1/	+	-	10	25	23	0	1	2	0	3	"	0	1	0	0	0	0	0	0	0	1
A66102-16	0	5	0	3	0	0	0	0	0	0	0	"	0	1	0	0	0	0	0	0	1	
A66122-3	0	5	-	3	0	0	0	0	3	0	3	"	0	0	0	0	0	0	0	0	1	
A68678-1	+	10	25	23	0	1	2	0	2	0	2	"	1	0	0	4	4	7				
A70365-27	+	35	50	13	0	4	2	0	2	0	2	"	29	33	0	0	0	18				
AC67560-1	0	5	3	13	0	0	0	0	0	0	0	"	1	0	0	2	2	3				
B7024-81	0	0	15	3	6	0	1	0	1	0	0	"	0	0	0	0	0	0	0	0	3	
WC521-12	0	5	-	11	9	4	2	0	2	0	0	"	0	0	0	0	0	0	0	0	4	
WC612-13	+	0	-	0	0	1	0	0	0	0	0	"	1	0	0	0	0	0	0	0	0.3	
Butte	0	10	10	3	0	0	1	0	1	0	0	"	0	0	0	0	0	0	0	0	3	
Russet Burbank	0	5	10	5	4	0	0	0	0	0	0	"	35	0	0	0	0	0	0	0	7	
Atlantic	+	30	-	15	-	1	-	0	-	0	-	"	6	33	9	9	9	16				
Norgold	+	12	-	12	-	0	-	0	-	0	-	"	20	0	0	5	5	8				
NDA8694-3	0	0	-	0	-	0	-	0	-	0	-	"	1	0	1	1	0.3					
NDA9249-3	+	50	-	14	-	2	-	2	-	2	-	"	9	10	-	9	10	-	17			

1/ + = Hollow heart present, amount not recorded.

Western Table 8. Merit Rating^{1/}, top five.

Variety	California (Kern) (TL)	Colo (AB)	Idaho (KIM)	Oregon (Herm)	Washington (Mat)	Washington (0th)	Wyoming (Pat)	Alb	Total Score
A66102-16	-	-	-	-	-	-	-	-	0
A66122-3	-	1	-	-	-	-	-	-	1
A68678-1	3	3	5	5	5	0	3	5	41
A70365-27	-	2	1	-	-	-	-	-	3
AC67560-1	-	-	4	3	2	-	2	1	15
B7024-81	1	-	2	-	-	-	-	-	3
WC521-12	5	-	-	-	1	3	-	4	14
WC612-13	-	-	-	3	2	-	5	5	14
Butte	-	4	-	4	4	-	2	-	16
Russet Burbank	-	-	3	1	-	4	3	-	11
Atlantic	4	5	-	2	-	4	3	2	5
Norgold	2	-	-	-	-	-	-	-	5
NDA8694-3	-	-	-	-	-	-	-	4	4
NDA9249-3	-	-	-	-	-	-	-	-	0

1/5 (highest) to 1 (lowest).

ALABAMA

J. L. Turner and Harrison Bryce - Main Station
E. L. Carden, R. N. McDaniel, Frank B. Selman and
Frank E. Garrett (Retired) - Gulf Coast Substation
Marlin H. Hollingsworth - North Alabama Horticulture Substation
John Eason and Marvin E. Ruf - Sand Mountain Substation

Irish Potato Variety Trial, Sand Mountain Substation
Crossville, Alabama

Experimental Procedure. Seed potatoes were obtained from Frito-Lay Company, Baldwin County, Alabama, North Dakota, Starks Farms, USDA and the University of Wisconsin for the 1979 trials. Selections grown this year were from thirteen named varieties and 22 numbered lines. Each entry was replicated 4 times in a randomized block design in plots 20 feet by 38 inches. Seedpieces were cut to approximately 1-1/2 ounces each and planted March 13. Seedpieces were planted by hand and spaced 12 inches in the drill. Plots were harvested July 10.

Results. The Fairhope planting in Baldwin County was a loss again this year due to excessive rain shortly after planting. Seedpieces rotted, therefore, poor stands were obtained and with some entries all the seedpieces rotted. At Crossville growing conditions were favorable through May. June was dry and hot. Yields were better than the 1978 trial but some entries did not perform well. Red La Soda, Atlantic and B 8829-9 were the three highest yield entries with B 8829-9 producing the highest total marketable yield. Atlantic and B 8829-9 produced the same yield of size A potatoes. A considerable yield difference was obtained from 2 sources of Atlantic seed. The poor yield from one source may be attributed to the poor stand. Red La Soda from one source produced a very poor stand and yield. Frito-Lay 1221 was the highest yielding of the Frito-Lay entries. Wisconsin 718 produced the highest yield of the Wisconsin entries. Of the red entries from Wisconsin, 806-R was rated highest for eye appeal. This line has about the same eye appeal as Red La Soda. Specific gravity for Wis-806-R was higher than Red La Soda. Size A of total yield was highest for Atlantic, B 6969-2, FL-1221 and La Chipper. Specific gravity was highest for B 6987-184 and Atlantic. The russet skin of B 8829-9 was rated higher for eye appeal than B 7583-6 and Belrus.

Alabama Table 1. Potato Variety Trial, Crossville, 1979^{1/}

Variety	Source	Marketable yield/acre			Size A of total	Specific ^{3/} gravity	Stand at harvest
		Total	Size A ^{2/}	Size B			
B 8829-9	USDA	181	161	20	89	1.068	89
Atlantic	Starks	173	161	12	93	.094	95
Red La Soda	Warren, Hartje - ND	172	157	15	91	.071	88
B 7828-13	USDA	164	148	16	90	.087	86
B 6969-2	USDA	162	151	11	93	.075	93
FL-1221	Frito-Lay	161	149	12	93	.080	94
Red La Soda	Kuezmarski & Sons - Wis.	161	141	20	88	.072	85
Superior	Starks	156	141	15	90	.079	98
Wis-718	U. Wisconsin	147	134	13	91	.082	80
La Chipper	Cornelius & Sons - ND	145	120	25	83	.076	84
La Chipper	Starks	143	133	10	93	.082	86
Wis-738	U. Wisconsin	142	128	14	90	.077	100
Wis-806 R	U. Wisconsin	142	109	33	77	.080	94
FL-795	Frito-Lay	139	124	15	89	.081	89
Norchip	Burbidge Farm - ND	132	105	27	80	.080	95
FL-657	Frito-Lay	132	122	10	92	.078	79
B 8812-3	USDA	131	109	22	83	.082	96
B 8692-3	USDA	131	105	26	80	.078	94
Wis-774 R	U. Wisconsin	128	113	15	88	.063	88
Wis-807 R	U. Wisconsin	128	108	20	84	.061	88
FL-162	Frito-Lay	124	99	25	80	.070	94
Belchip	USDA	121	106	15	88	.078	89
FL-96	Frito-Lay	118	103	15	87	.078	94
FL-1152	Frito-Lay	106	92	14	87	.068	85
B 7151-4	USDA	102	88	14	86	.076	98
Norchip	Starks	93	82	11	88	.090	65
Atlantic	Tibert - ND	93	86	7	92	.093	58
B 8823-9	USDA	86	62	24	72	.068	89

Alabama Table 1. Continued

Variety	Source	Marketable yield/acre			Size A of total %	Specific ³ / gravity	Stand at harvest %
		Total	Size A ² / Cwt.	Size B Cwt.			
B 6987-184	USDA	82	67	15	81	.096	81
Wis-748	U. Wisconsin	82	73	9	89	.071	94
Wis-726	U. Wisconsin	80	70	10	88	.078	74
B 7583-6	USDA	77	59	18	77	.089	64
Belrus	USDA	64	45	19	70	—	83
Red La Soda	Starks	49	45	4	92	.071	30

¹Soil test p = 145 (VH); K = 128 (H); pH = 5.6.

²Size A = potatoes with 1 7/8 inches diameter and larger; Size B = potatoes with 1 1/2 - 1 7/8 inches diameter.

³Specific gravity was greater than 1.0 for each variety.

Alabama Table 2. Characteristics of Potato Varieties, Crossville, 1979

Variety	Source	Eye ₁ / depth ₁ /	Eye ₂ / size ₂ /	Skin color ₃ /	Shape ₄ /	Eye appeal ₅ /	Harvest season ₆ /
B 8829-9	USDA	S	M	Russet	L	4.0	E
Atlantic	Starks	M	M	Wh-SR	R	4.5	L
Red La Soda	Warren, Hartje - ND	D	L	Red	R	4.5	L
B 7828-13	USDA	M	M	Wh-SR	R-F	3.0	E
B 6969-2	USDA	S	S	Wh	R	4.0	E
FL-1221	Frito-Lay	D	L	Wh	R	4.0	E
Red La Soda	Kuezmarski & Sons - Wis.	D	L	Red	R	4.5	L
Superior	Starks	M	M	Wh-SR	R	4.5	E
Wis-718	U. Wisconsin	S	S	Wh	R	4.0	L
La Chipper	Cornelius & Sons - ND	D	L	Wh	R	3.0	E
La Chipper	Starks	S	S	Wh	R	3.0	M
Wis-738	U. Wisconsin	S	S	Wh-SR	R	4.5	E
Wis-806 R	U. Wisconsin	S	M	Red	R	4.5	M
FL-795	Frito-Lay	S	S	Wh	R	3.5	L
Norchip	Burbridge Farm - ND	S	S	Wh	R-F	4.5	M
FL-657	Frito-Lay	D	L	Wh	R-F	3.5	M
B 8812-3	USDA	S	S	Wh	R	3.5	E
B 8692-3	USDA	M	M	Wh	R	3.5	E
Wis-774 R	U. Wisconsin	S	M	Dark Red	L	3.0	L
Wis-807 R	U. Wisconsin	S	M	Red	R	4.0	E
FL-162	Frito-Lay	S	M	Wh	R-L	3.0	L
Bellchip	USDA	D	L	Wh	R-L	3.0	L
FL-96	Frito-Lay	D	S	Wh-SR	R	3.0	E
FL-1152	Frito-Lay	S	S	Wh	R	4.0	L
B 7151-4	USDA	D	L	Wh	R	3.0	L
Norchip	Starks	S	S	Wh	R-F	4.5	M
Atlantic	Tibert - ND	M	M	Wh-SR	R	4.5	L
B 8823-9	USDA	S	S	Wh	R	3.0	M

Alabama Table 2. Continued.

Variety	Source	Eye depth ^{1/}	Eye size ^{2/}	Skin color ^{3/}	Shape ^{4/}	Eye appeal ^{5/}	Harvest season ^{6/}
B 6987-184	USDA	M	M	Wh-SR	R-L	3.5	M
Wis-748	U. Wisconsin	S	S	Wh-SR	R	4.5	E
Wis-726	U. Wisconsin	S	S	Wh	R-L	4.0	M
B 7583-6	USDA	S	S	Russet	L	3.5	L
Belrus	USDA	M	L	Russet	L	3.5	L
Red La Soda	Starks	D	L	Red	R	4.5	L

1/ S = shallow; M = medium; D = deep.

2/ S = small; M = medium; L = large.

3/ Wh = white; SR = some russet.

4/ R = round; F = flat; L = long.

5/ 5 = excellent; 4 = good; 3 = fair; 2 = poor; 1 = very poor.

6/ E = 90; M = 95; L = 100 days from planting to harvest.

ALASKA

Curtis H. Dearborn

Potato Research

Climate. May and the first half of June were dry and cool, July was the wettest on record and then no rain until September 22. The growing season was wet, cool and long.

Culture and Phenotypes. In earlier studies of potato I observed that Alaska Frostless tubers were set much deeper in the soil than were those of commercial varieties. Chemical weed control eliminates the need for maintaining a ridge or hill so a potato that can be grown in flat culture without tuber greening significantly reduces tillage. I am using flat culture on all seedlings and selecting plants producing no green tubers. To be certain that depth differences really existed, we hand dug three hills from every seedling making sure that the end hill was always one of the three harvested. Very few seedlings of some crosses set their tubers deep enough to avoid greening. Of the material kept for other desirable horticultural characteristics, 76 percent showed no greening. It is known that climatic conditions just prior to tuberization affect the position of stolon tips at tuberization. Earlier work revealed that there are significant phenotypic differences especially where frost resistant parental material is involved in a cross.

Sprout tuber studies were continued. Clones that developed sprout tuber in 1978 performed the same in 1979. A few clones produced normal tops even though the seed tubers were stored warm (50°F) from harvest in September to planting in May. This illustrates that significant genetic differences exist for the sprout tuber characteristic.

Imports. Except for Superior, clones shown in the Alaska Table were grown in Alaska for the first time in 1979. The results are derived from data on a single plot of 20 hills or more. Quality as measured by specific gravity was low in all except BR 7088-18 and Superior. Clone C 7356-13A may have potential as an 'early' as 22 percent of its production exceeded 3-1/2 inch diameter. Growth cracking accounted for most of the 17 percent balance.

Replicated Trials. Thirty six clones were grown and harvested 90 days after planting and are referred to as Early Harvest. A similar collection of 36 clones were grown and harvested 120 days after planting and called Late Harvest. A third group of 20 russets was handled as Late Harvest.

Clones in the Early Harvest ranged in yield of U.S. #1's from 254 cwt to 43 cwt per acre. Specific gravities ranged from 1.097 to 1.055. Specific gravity for the 36 clones averaged 1.080. It may be of interest to some to note that ND 8891-3 ranked 30th among the 36 in weight of No. 1 potatoes with a specific gravity of 1.071. Clone B 7631-3 ranked 10th in yield with 1.076 specific gravity.

Late Harvest clones yielded from 406 to 181 cwt of marketable per acre with an average specific gravity of 1.102. Alaska Red ranked first at 1.094, MN 3866 fifth at 1.090, ND 8891-3 ranked 28th at 1.094 and Atlantic ranked 33rd at 1.106.

Russets ranged in yield from 292 to 128 cwt of marketable tubers per acre with an average specific gravity of 1.103. Butte produced at the rate of 287 cwt per acre marketable at 1.106, Allagash was equally productive, 287 cwt at 1.101 and 83 percent of its production was marketable. Neb. 42-1 was fourth in rank with a low specific gravity of 1.098 relative to the average of all clones. Centennial ranked 12th and Belrus 17th in the 20 clones study. B 8934-2 AK still looked good and is being entered in the 1980 NC Regional Trials.

Alaska Table. Potato clones imported and grown at Matanuska Research Center in 1979.

Clone	Weight		Specific Gravity	U.S. #1 %	Of Total Weight		Under 2" Diameter %
	Total Cwt.	#1 Cwt.			Over 3-1/2" Diameter %	Under 2" Diameter %	
Nipigon	379	335	1.089	88	7	0	
Pembena Chipper	408	267	1.090	65	3	7	
BR 7088-18	363	264	1.102	73	0	6	
NY 61	311	247	1.086	79	5	10	
Superior	286	218	1.100	76	6	2	
AF 205-9	266	174	1.096	65	0	6	
C 7356-13A	265	161	1.087	61	22	0	
Belchip	134	97	1.092	73	0	1	

COLORADO

J. A. Twomey, D. G. Holm, and M. Workman

Potato Seedling and Varietal Evaluation

Seedling Program. Four hundred first-year seedlings were selected from 40,000 grown in 1979. Fourteen second-year and twenty advanced seedlings were selected for increase and evaluation.

Thirty-eight clones were tested for chip color and specific gravity. The results of the most promising selections may be found in Colorado Table 1.

Clonal Nutrient-Use Efficiency. A preliminary field study was conducted to evaluate the nutrient-use efficiency of several potato clones as measured by differential yield response and differential nutrient uptake.

Twenty-three clones were planted May 18, 1979, in a randomized complete block with four replications. Nitrogen and phosphorus were applied to two replications at the rate of 92 and 103 pounds per acre, respectively, at planting. The other two replications did not receive fertilizer.

Results are summarized in Colorado Table 2. Clones responded differentially to fertilizer application. Yield responses ranged from one cwt/A for WC672-9 to 111 cwt/A for WC618-9. Only five clones (A6680-5, WC618-9, WC672-9, Atlantic, and Nooksack) differed ($P = 0.25$) from the average fertilizer response of 53 cwt/A.

Clones differed significantly in the amount of N, P, and K accumulated in the tubers. Pounds nutrients accumulated per 100 cwt tubers ranged from 22.9 - 40.4, 4.62 - 6.10, and 34.3 - 46.3, respectively, for N, P, and K.

Preliminary results indicate that it may be possible to develop potato cultivars which more efficiently utilize available mineral nutrients.

Colorado Table 1. Chip Color^{1/} and Specific Gravity^{2/} of Promising Advanced Seedlings at Harvest and After Storage.

Seedling No.	At Harvest	Warmed 2 Wks @ 65° F						Specific Gravity
		3 Wks 65° F Post Harvest	10 Wks Storage @ 40° F	10 Wks Storage @ 50° F	10 Wks Storage @ 40° F	10 Wks Storage @ 50° F	Color	
		Color	Color	Color	Color	Color	Color	
BC9333-6	35.0	34.0	10.0	21.0	19.0	31.0	1.085	
BC9336-1	40.0	43.0	10.5	21.0	14.0	33.5	1.090	
BC9362-2	38.0	34.0	10.0	18.5	23.5	26.0	1.089	
BC9384-1	37.0	43.0	16.0	34.0	31.0	33.0	1.093	
BC9407-3	37.0	41.0	8.0	25.0	40.0	36.0	1.100	
WC612-13	43.0	38.0	10.0	20.0	33.5	33.0	1.095	
BC9099-3	43.0	41.0	14.0	25.5	31.0	33.0	1.102	
BC9020-7	47.0	46.0	11.0	31.0	31.0	41.0	1.100	
BC9071-6	37.5	42.0	12.0	30.0	15.0	31.0	1.091	
Atlantic	44.0	43.0	14.0	26.0	35.0	34.0	1.104	
WC521-12	41.0	46.0	12.0	24.0	20.0	33.0	1.109	
WC672-2	41.0	42.5	18.0	35.0	31.0	36.0	1.098	

^{1/} Chip color determined with Photovolt reflectance meter. Color readings of 25 and above are acceptable.

^{2/} Specific gravity determined by potato hydrometer and air/water method.

Colorado Table 2. Yields, fertilizer effect on yield, percent dry matter, and pounds of N, P, and K accumulated per 100 cwt of tubers of twenty-three potato clones.

Clone	Yield ^{1/} (cwt/A)	Δ ^{2/} (cwt/A)	% Dry Matter ^{3/}	Lb/100 cwt Tubers ^{1/}		
	N	P	K			
A6680-5	234	6	21.4	32.2	5.32	34.3
A68678-1	417	83	26.6	26.6	5.11	35.5
AC67560-1	391	66	23.7	23.9	5.38	40.7
BC8370-4	279	31	25.3	26.2	4.90	39.8
BC8524-3	289	81	25.2	22.9	6.10	45.5
WC230-14	283	24	23.7	27.6	4.62	35.9
WC316-1	250	51	25.0	28.8	5.30	42.6
WC521-12	327	15	28.6	25.9	5.28	36.9
WC523-8	209	93	25.1	33.8	5.92	39.6
WC530-12	321	78	27.4	29.1	6.08	46.3
WC567-1	386	27	22.8	24.9	4.72	36.4
WC612-6	366	40	24.8	26.5	5.52	38.0
WC612-13	415	39	28.2	27.1	5.52	42.0
WC618-9	288	111	24.9	26.0	5.48	39.0
WC654-13	180	51	25.7	40.4	5.92	42.6
WC672-2	358	44	28.1	28.4	5.54	42.3
WC672-9	352	1	28.1	28.7	5.74	43.7
WC686-3	322	34	29.0	28.6	5.99	39.5
Atlantic	245	4	27.0	32.0	5.53	38.9
Centennial Russet	337	91	23.8	30.6	5.72	42.0
Nooksack	370	110	28.1	28.2	5.94	45.5
Red McClure	446	57	26.3	28.2	5.48	45.2
Russet Burbank	424	85	26.0	29.5	4.93	40.6
Mean	326	53	25.9	28.5	5.50	40.6
LSD (0.05)	59	-	1.2	5.4	.84	4.3

^{1/}Mean of the two replications that received fertilizer.

^{2/}Yield reduction associated with the lack of fertilizer application.

^{3/}Mean of four replications.

FLORIDA

J. R. Shumaker, D. P. Weingartner, James Watts, and Raymon E. Webb

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for their adaptability and desirable horticultural characteristics at the Agricultural Research Center, Hastings, Florida. Clones were grown in either advanced (four replications) or intermediate (two replications) trials. Soil fumigation and planting and harvest dates are shown in procedures, Florida Tables 1-4. Commercial cultural practices were used on all tests. Yield and tuber appearance were taken at harvest. Tuber samples were shipped to Berwick, Pennsylvania, for specific gravity and chip color evaluation.

Interregional Yield and Quality Tests (Florida Table 1). Atlantic (standard processing variety) produced the highest yields with high specific gravity and acceptable chip color. Clones, however, did not differ significantly for yield response. USDA seedling B6987-184 and Belchip combined excellent chip color with high specific gravity. Superior and B6969-2 combined highly desirable tuber appearance and yield with moderate specific gravity and acceptable chip color.

Advanced Yield and Quality Tests (Florida Table 2). Several clones produced yields of high quality tubers and chip color equal to that produced by Atlantic. Some of the more promising clones were B8713-24, B8428-10, B8907-4, C7232-7, B8689-6, B8884-7, B8799-13, La Chipper, Norchip, Denali and Superior.

Intermediate Yield and Quality Tests (Florida Table 3). Seedlings which compared favorably with either Atlantic (standard processing type) or Superior (standard white table type) will be tested further in 1980.

Advanced Russet Tests (Florida Table 4). USDA seedling B8833-6 was the most promising long russet clone tested in 1979, combining high yield, excellent tuber appearance and high solids. Both Butte and B7583-6 closely followed the response of B8833-6. These three clones will be extensively tested in 1980. If their performance equals that of 1979, they will be extensively grower tested in 1981.

Florida Table 1. Results from 13 clones selected for inter-regional yield and quality testing at Hastings, Florida--1979.

Clone	Yield USDA cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			Weeks after harvest	1	2	3	
Atlantic	318	6.0	3	5	5	4.3	1.067
B8091-8	317	6.6	2	4	5	3.7	1.061
Superior	316	8.2	2	5	5	4.0	1.068
B8004-8	309	8.2	3	5	8	5.3	1.055
Belchip	301	4.8	2	2	4	2.7	1.064
Sebago	279	6.5	2	5	6	4.3	1.059
B6969-2	275	8.0	2	4	6	4.0	1.058
B8073-3	268	6.8	3	5	5	4.3	1.063
B7516-9	268	5.5	5	6	7	6.0	1.054
B6987-184	263	4.5	1	2	3	2.0	1.070
B8616-2	263	6.8	2	5	5	4.0	1.073
B7516-7	261	5.8	3	4	5	4.0	1.066
B8599-42	253	6.5	3	4	3	3.3	1.057
LSD (0.05)		NS	1.4				
		(0.01)	NS	1.9			

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

2/ Chip color 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

PROCEDURES: Soil fumigation = 8 gpa preplant Telone + 3 lb ai/A Temik in-the-row at planting. Replications = 4. Plot = 20 hill units (20 ft.). Planted = 2/9/79. Harvested = 5/21/79.

Florida Table 2. Results of 44 clones selected for advanced yield and quality testing at Hastings, Florida
-- 1979.

Clone	Yield USDA cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			Weeks after harvest	1	2	3	
B8433-4	372	4.2		5	6	6	5.7 1.050
Rideau	365	6.5		2	6	7	5.0 1.060
B8713-24	360	5.2		3	3	6	4.0 1.063
B8812-15	347	6.0		2	3	6	3.7 1.057
BR7093-23	343	6.2		2	2	3	2.3 1.055
B8766-1	340	6.2		5	6	7	6.0 1.066
Atlantic	338	6.8		1	3	6	3.3 1.068
La Chipper	336	3.5		3	3	5	3.7 1.066
B8352-3	333	5.8		5	2	5	4.3 1.060
Sebago	333	6.5		1	3	6	3.3 1.059
B8724-2	330	5.2		1	4	5	3.3 1.061
Michibonne	327	5.0		5	5	6	5.3 1.052
CA02-7	319	6.2		2	3	5	3.3 1.055
B7200-33	317	8.0		2	5	5	4.0 1.059
B8428-10	317	7.2		1	4	4	3.0 1.063
B8907-4	317	7.8		2	3	6	3.7 1.061
CD106-16	316	6.5		4	5	6	5.0 1.062
CC05-17	315	7.5		4	4	7	5.0 1.067
Michimac	313	5.8		5	6	6	5.7 1.054
B8932-2	312	6.2		1	2	6	3.0 1.059
C7232-7	305	8.0		1	2	3	2.0 1.060
B8692-3	303	7.2		2	5	6	4.3 1.065
B6969-2	302	6.5		4	5	6	5.0 1.056
B9062-9	302	5.8		1	3	3	2.3 1.066
B8947-3	299	6.5		6	6	7	6.3 1.061
B8720-6	292	8.0		2	3	5	3.3 1.055
B8689-6	292	4.0		2	3	5	3.3 1.061
Norchip	291	4.5		2	2	4	2.7 1.067
B8884-7	289	5.0		2	3	5	3.3 1.072
B9071-1	282	6.2		1	3	4	2.7 1.061
Denali	279	7.0		1	5	5	3.7 1.070
B8812-4	278	7.2		5	6	6	5.7 1.068
B8799-13	272	6.5		1	4	5	3.3 1.074

Florida Table 2. Continued.

Clone	Yield USDA cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			1	2	3	Mean	
Superior	263	7.7	2	3	4	3.0	1.070
B8766-4	254	7.2	1	3	6	3.3	1.060
PA8YY-3	235	3.5	2	3	5	3.3	1.061
PA8YW-1	235	4.5	2	3	5	3.3	1.061
Trent	230	4.5	2	2	4	2.7	1.075
Campbell #11	220	5.5	1	2	3	2.0	1.066
G6880-1	206	7.2	1	4	6	3.7	1.061
B8429-9	202	4.8	5	6	6	5.7	1.055
B8477-4	200	4.2	4	4	5	4.3	1.061
B8477-11	106	6.7	1	2	2	1.7	1.070
LSD (0.05)		54	1.6				
(0.01)		72	2.2				

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

2/ Chip color 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

PROCEDURES: Soil fumigation = 8 gpa preplant Telone + 3 lb ai/A Temik in-the-row at planting. Replications = 4. Plot = 20 hill units (20 ft.). Planted = 2/9/79. Harvested = 5/21/79.

Florida Table 3. Results from 111 clones selected for intermediate yield and quality testing at Hastings, Florida--1979.

Clone	Yield USDA cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			Weeks after harvest	1	2	3	
B8999-10	215	7.5					
B9014-11	196	6.5					
B9024-19	149	4.5					
B9024-27	251	5.5	6	7	8	7.0	1.059
B9028-6	155	3.0					
B9028-25	56	1.5					
B9042-4	286	5.5					
B9062-2	232	6.0					
B9062-5	242	7.0					
B9071-4	222	5.5	5	5	6	5.3	1.053
B9071-5	143	4.5					
B9082-5	192	5.5					
B9126-11	322	5.0					
B9127-1	366	7.0	6	6	6	6.0	1.059
B9127-6	373	7.0	2	3	3	2.7	1.059
B9127-17	379	8.0	7	6	6	6.3	1.071
B9128-1	243	8.0					
B9128-35	278	8.0					
B9128-63	379	6.0	8	6	8	7.3	1.064
B9128-69	380	7.5	4	5	8	5.7	1.071
B9129-22	342	7.0	6	5	5	5.3	1.067
B9130-7	289	6.0	3	4	5	4.0	1.064
B9130-12	262	6.0					
B9130-17	161	5.0					
B9130-24	302	8.0	4	5	5	4.7	1.068
B9130-34	303	6.5	3	4	5	3.3	1.052
B9132-16	242	6.5	5	6	7	6.0	1.051
B9136-7	324	8.0	6	6	8	6.7	1.049
B9137-9	256	5.5	3	3	5	3.7	1.055
B9138-7	335	5.5	6	5	5	5.3	1.066
B9138-29	344	6.5	5	6	4	5.0	1.066
B9138-34	320	7.0	5	5	5	5.0	1.064
B9139-1	247	5.0					
B9139-24	289	8.5	6	6	6	6.0	1.057
B9139-29	325	7.0	6	6	6	6.0	1.058
B9139-34	271	4.0					
B9140-1	234	5.0					
B9140-2	255	6.5					
B9140-4	282	6.5					
B9140-6	319	7.0	3	4	5	4.0	1.069
B9140-7	265	5.5	3	2	3	2.7	1.063
B9140-14	301	6.5					
B9142-11	269	4.5					

Florida Table 3. Continued.

Clone	Yield US1A cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			Weeks after 1	2	3	Mean	
B9144-5	265	7.5	3	2	3	2.7	1.070
B9146-3	243	8.0	4	6	5	5.0	1.068
B9147-3	343	7.5	5	7	6	6.0	1.058
B9147-8	320	8.0	6	5	6	5.7	1.061
B9148-5	263	5.5					
B9150-5	323	3.5					
B9152-11	318	7.0	3	4	5	4.0	1.073
B9152-13	306	6.0	6	5	6	5.7	1.068
B9152-44	275	7.5	3	2	3	3.3	1.067
B9153-6	276	7.5	5	5	6	5.3	1.067
B9155-5	271	7.5	5	6	6	5.7	1.067
B9155-12	200	5.5					
B9156-4	184	7.0					
B9156-6	298	8.5	5	6	7	6.0	1.063
B9156-10	263	5.0					
B9165-3	227	6.5					
B9172-4	332	3.0					
B9175-7	269	7.5	5	3	3	3.7	1.071
B9184-2	204	4.5	3	3	5	3.0	1.058
B9191-5	325	5.0	3	3	4	3.3	1.061
B9191-7	301	7.2	2	3	6	3.7	1.056
B9200-1	286	6.5	5	5	6	5.3	1.058
B9215-2	270	3.0					
B9216-9	221	5.0					
B9219-2	285	7.5	6	4	5	5.0	1.058
B9221-14	283	7.0	3	6	4	4.3	1.061
B9224-6	314	5.0	5	6	6	5.7	1.066
B9228-2	223	7.5	5	4	4	4.3	1.066
B9230-5	191	5.5	4	5	4	4.3	1.056
B9230-6	272	7.5	5	5	7	5.7	1.054
B9243-3	328	5.0	5	6	6	5.7	1.047
B9253-1	217	5.5	1	2	3	2.0	1.067
B9254-6	308	6.0	5	5	6	5.3	1.058
B9257-2	278	4.0					
B9258-2	237	7.5	5	3	5	4.3	1.066
B9262-1	330	7.0	5	6	7	6.0	1.059
B9281-9	261	7.0	3	6	7	5.3	1.050
B9285-2	255	7.0	4	4	5	4.3	1.071
B9285-3	283	7.5	2	7	8	5.7	1.068
B9286-1	232	5.5					
B9286-4	347	7.0	5	6	8	6.3	1.054
B9295-2	238	4.0	4	5	6	5.0	1.064
B9296-3	219	5.5					

Florida Table 3. Continued.

Clone	Yield USA cwt/A	Tuber appearance ^{1/}	Chip Color ^{2/}				Specific Gravity
			Weeks after harvest	1	2	3	
B9296-5	170	6.0					
B9311-4	294	7.5	7	6	6	6.3	1.065
B9311-7	330	8.5	3	3	3	3.0	1.073
B9311-11	279	6.5	6	5	6	5.7	1.067
B9311-13	303	8.5	3	3	3	3.0	1.059
C7333-23	243	6.0					
C7339-15	257	6.5					
C7395-9	256	6.5	4	3	4	3.7	1.067
C7396-10	333	5.0					
C7397-1	308	4.5	1	2	2	1.7	1.059
C7398-13	275	7.0					
C73100-4	382	5.5	2	2	3	3.3	1.052
C73107-8	189	7.0					
C7409-1	361	7.5	4	5	6	5.0	1.057
C7461-7	190	6.0					
C7490-2	311	8.5	3	4	5	4.0	1.064
C74109-8	411	8.5	5	6	6	5.7	1.063
C74127-1	278	6.5	3	3	6	4.0	1.061
C74129-1	298	6.5	3	4	6	4.3	1.053
C74131-2	336	6.0	6	7	6	6.3	1.069
Pa9HU-2	318	4.0	3	5	5	4.3	1.061
Pa9II-1	305	7.0	3	4	5	4.0	1.070
Pa9II-2	341	6.0	5	6	5	5.3	1.063
Pa9LE-3	221	6.0	6	7	7	6.7	1.061
Pa9LN-2	262	3.0	2	3	5	3.3	1.076
Sebago	335	5.7	3	5	6	4.7	1.057
Atlantic	349	6.5	3	3	5	3.7	1.074
Superior	329	7.0	5	5	4	4.7	1.069
B6969-2	255	7.6	4	5	5	4.7	1.055
Belrus	236	8.0	3	2	4	3.0	1.061

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

2/ Chip color 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

PROCEDURES: Soil fumigation = 8 gpa preplant Telone + 3 lb ai/A Temik in-the-row planting. Replications = 2. Plot = 20 hill units (20 ft.). Planted = 2/9/79 . Harvested = 5/22/79.

Florida Table 4. Results from 8 russet clones selected for advanced testing at Hastings, Florida--1979.

Clone	Yield USDA cwt/A	Tuber appearance ^{1/}	Specific Gravity
B8833-6	267	8.4	1.067
Centennial	260	6.0	1.056
Butte	254	6.6	1.069
B7583-6	253	7.0	1.065
Norgold Russet	243	5.0	1.063
AF193-4	221	7.0	1.062
Bel Rus	204	8.0	1.065
B8812-13	150	4.2	1.040
LSD (0.05)	38	0.9	
(0.01)	52	1.2	

^{1/} From 9.0 = most desirable to 0.0 = completely undesirable.

PROCEDURES: Soil fumigation = 8 gpa preplant Telone + 3 lb ai/A Temik in-the-row at planting. Replications = 4. Plot = 20 hill units (20 ft.). Planted = 2/9/79. Harvested = 5/23/79.

IDAHO AND EASTERN OREGON

J. J. Pavek, D. Corsini, C. Stanger, and Sheri Michener

Yield Trials

Early harvest trials were again conducted at Aberdeen, Idaho and at Malheur County, Oregon. The regular late harvested trials were conducted at these two locations and at Kimberly, Idaho. At each location fertilizer was applied according to soil test results, pre-emergence herbicides were used and insecticides were banded at planting at Aberdeen and Kimberly and fall applied at Malheur. Irrigation water was applied through sprinklers at Aberdeen and by furrows at the other locations. Vines were beat off just prior to the early harvests and for both harvests at Malheur, and were killed with a desiccant or by frost in the late harvested trials at the other two locations. Temperatures averaged 1 to 1.5°F above normal in May and June, about 0.5 to 1.8°F below normal in July and August, and 2.4°F above normal in September. Rainfall generally was insignificant.

Clones showing most promise in the early harvest (ID-OR Table 1) are NDA8694-3 and A68678-1. In the late trial (ID-OR Table 2) A72685-2, A68678-1, and A66102-16 appear most promising. Official release of A68678-1 is planned for 1980.

Disease Evaluations

Evaluation for disease resistance was as follows: Verticillium wilt and early blight--second and later field generations; common scab and Fusarium dry rot--third and later generations; and tuber blight (Alternaria) and net necrosis (leafroll)--all advanced generations (ID-OR Table 3).

Field experiments and storage trials were conducted to improve tuber early blight resistance testing and to study factors contributing to Verticillium resistance or tolerance. Yield potential, early dying symptoms, and extent of Verticillium infection were measured in five advanced selections and three varieties comprising the full observed range of Verticillium reactions. Under severe Verticillium pressure the yields were inversely related to infection and to symptom development. Wilt symptoms were highly correlated with recovery of Verticillium from stem apices for all clones. Higher nitrogen levels and fumigation did not give enough control to distinguish between degree of tolerance and degree of resistance. Yield potential and early dying symptoms at Aberdeen appear to be as effective criteria for evaluating Verticillium resistance as measuring actual infection level. The study of the nature of Fusarium dry rot resistance is being continued. Crossing and selection to incorporate high resistance to PVS, Fusarium dry rot, and Rhizoctonia stem canker into useful parent lines is in progress.

Distribution

Distribution of breeding selections, named varieties, and seedling tubers during 1979 is summarized in ID-OR Table 4. Over 2000 requests for 'Butte' were processed, only distribution for experimental purposes is included in the table.

ID-0R Table 1. 1979 Advanced early harvest yield trial^{1/}

Yld cwt/A	Malheur Station						Aberdeen Station						Tubers ^{3/} Rus. Shape
	Total Tot	U.S. Tot	No. >10 oz	1's >6 oz	Sp. Gr.	F.Fry ^{2/} Color	Total Yld cwt/A	U.S. Tot	No. >10 oz	1's >6 oz	Sp. Gr.	F.Fry ^{2/} Color	
	%	%	%	%			%	%	%	%			
NDA8694-3	496	89	60	83	1.078	0.5	424	86	23	70	1.068	0.5	M- 0
A(LR)22-2	488	88	53	82	83	0.6	482	84	33	68	72	0.5	Lt 0
Pioneer	456	90	48	79	83	0.5	556	92	49	81	72	0.6	Red 0
A68678-1	431	92	55	82	89	0.5	464	91	60	82	77	0.6	M+ 0-L
A72331-14	430	83	37	68	84	0.5	416	81	22	59	71	0.5	Lt 0
A70365-6	415	82	55	72	78	0.5	-	-	-	-	-	-	M.Lt 0
NDA9249-3	402	87	60	80	81	0.8	415	84	50	75	63	0.6	M+ 0-L
Atlantic	400	89	35	74	98	0.5	570	82	38	70	82	0.5	Lt.Sc. R-0
A72687-11	377	90	51	79	79	0.5	538	92	52	83	73	0.5	V.Lt. 0
Norgold	348	84	37	68	70	1.0	430	87	39	72	66	0.6	M 0
A73175-6	343	94	64	86	80	0.5	-	-	-	-	-	-	-
A72421-4	300	84	33	70	82	0.6	-	-	-	-	-	-	-
A72602-2	300	83	44	71	95	0.6	-	-	-	-	-	-	-
A72331-17	260	83	47	71	77	0.5	307	84	50	75	71	0.5	Non Red R-0
AC67560-1	-	-	-	-	-	-	525	86	32	71	61	0.6	0-L
A73414-1	-	-	-	-	-	-	496	85	31	72	70	0.5	M.Lt. 0-L
A72450-9	-	-	-	-	-	-	375	90	42	77	66	0.6	M L-0
A7248-13	-	-	-	-	-	-	348	73	14	49	72	0.6	M.Hv. 0-L
A73145-5	-	-	-	-	-	-	345	63	13	42	72	0.5	Hv. L
Bel Rus	-	-	-	-	-	-	350	82	18	59	76	0.5	Hv. 0-L
Mean	389	-	1.083	0.6	440	-	-	-	-	1.071	0.5	-	-
LSD ^{.05}	56	-	.005	0.1	61	-	-	-	-	.003	0.1	-	-

1/ Planting date: Malheur - April 20, Aberdeen - April 30; Harvest date: Malheur - Aug 8, Aberdeen - Aug 20.

2/ French fried within 5 days of harvest, 0.5 (lightest) to 4.0 (darkest).

3/ Lt = light, M = medium, Hv = heavy, Sc = scaly, V = very, non = smooth, 0 = oblong, L = long, R = round, R-0 = round to oblong, Sh = short.

ID-0R Table 2. 1979 Advanced late harvest yield trial^{1/}

	Aberdeen						Kimberly						Malheur					
	Total U.S. No. 1's			Total U.S. No. 1's			Total U.S. No. 1's			Total U.S. No. 1's			F. Fry ^{2/}			Tubers		
	Yld	Tot	>10 oz	Sp.	Yld	Tot	>10 oz	Sp.	Yld	Tot	>10 oz	Sp.	Color	Rus.	Shape			
	cwt/A	%		Gr.	cwt/A	%		Gr.	cwt/A	%		Gr.						
A72685-2	629	85	59	1.083	332	83	45	1.086	606	91	67	1.102	1.1	M	0			
A67142-1	590	88	53	74	309	78	18	80	-	-	-	-	0.7	Non	Sh.0			
A68710-5	572	74	46	70	345	71	26	74	-	-	-	-	0.9	M-	0-L			
Russet B*	554	65	27	75	283	62	7	71	512	79	34	89	0.7	M	L			
A72320-35	540	88	46	73	277	74	20	78	402	62	38	81	1.0	M-	L-0			
A73400-3	538	70	15	94	299	61	8	92	483	63	24	103	0.6	Lt	0			
Butte	512	87	35	76	333	77	13	79	441	78	44	103	1.2	M-	L-0			
A70369-2	509	82	28	83	362	67	10	88	-	-	-	-	0.6	V.Lt	R-0			
A68678-1	509	86	54	85	346	73	19	87	528	87	56	95	0.6	M+	0			
A73414-15	504	88	38	84	210	75	14	80	284	75	37	88	0.6	M+	L-0			
A66102-16	492	82	46	80	253	75	30	79	493	75	40	94	1.1	Lt	0			
A73143-4	460	87	40	78	303	67	17	75	402	84	43	86	1.4	M	0-L			
NDA9729-2	457	86	33	76	304	87	30	72	-	-	-	-	1.5	M	0			
A7269-7	454	83	25	79	314	71	9	77	-	-	-	-	1.4	M	0			
A72692-1	446	75	17	75	208	49	7	68	-	-	-	-	0.9	M	L			
A7353-25	437	82	37	83	221	77	26	79	352	80	46	101	0.8	V.Lt	0			
A72450-9	382	84	35	65	179	73	13	71	-	-	-	-	1.0	M.Hv	L-0			
A7248-13	357	78	15	76	238	73	11	73	-	-	-	-	1.4	M+	0-L			
Mean	493	81	37	1.079	286	72	19	1.079	450	79	44	1.094	1.0					
LSD _{0.05}	86			.004	54			.003	95		.005	.005	0.3					

^{1/} Planting and harvest dates: Aberdeen, 5/1 and 9/24; Kimberly, 4/26 and 10/4; Malheur, 4/20 and 10/16.^{2/} French fried after 3 months at 45°F; 0.5 (lightest) to 4.0 (darkest), mean for the two or three locations.^{3/} See footnote 3, ID-0R Table 1.

ID-OR Table 3.

Disease Evaluations

Mat- urity (1-5)	Dorm- ancy ^{2/} (0-5)	Vert- Wilt ^{1/} (0-9)	Early Foliation (0-9)	Blight Tuber ^{3/} (0-5)	Common Scab (0-5)	Fus- arium Dry Rot ^{3/} (0-5)	Leafroll Net Necrosis ^{2/} (0-5)
<u>Late Harvest:</u>							
A67142-1	3.7	2.5	2	4**	1.3	0.5	3.4
A68710-5	2.8	-	4	7	0.3	0.1	3.9
A70369-2	3.3	3.7	4	6	0	0.4	3.6
A7248-13	3.3	-	2	6	0	1.5**	1.5**
A7269-7	2.8	1.7	3	7	0.3	0.1	3.1
A72320-35	3.3	0	2	4**	1.3	0.4	2.4*
A72450-9	2.2	-	7**	9**	1.5	0.4	3.2
A72685-2	3.7	3.7	2	3**	0.3	1.8*	3.6
A72692-1	2.8	-	4	5	0.7	0.1	3.7
A7353-25	3.3	0	2	4	0	0.3	3.1
A73143-4	3.3	0	2	5	0	0.1	2.2 **
A73400-3	3.7	0	2	4**	1.8	0.1	3.5
A73414-15	3.7	-	2	4**	0	0.1	2.7
NDA9729-2	2.8	0	4	7	1.1	1.5**	2.5*
<u>Regional Trial:</u>							
A66102-16	3.7	2.5	1**	3**	1.0	0.4	2.9
A66122-3	3.3	-	2	5	-	0	-
A68678-1	3.3	2.8	2	6	0.7	0.1	3.2
A70365-27	3.3	-	2	5	-	0	-
AC67560-1	2.2	3.0	4	7	0.7	0.3	2.4*
B7024-81	2.2	3.0	4	7	2.5*	2.2**	2.9
WC521-12	3.3	-	3	5	-	1.7**	-
WC612-13	3.7	-	2	4**	-	3.0**	-
Butte	2.8	2.0	4	7	0.7	0.1	2.9
Russet B.	3.3	0	4	6	0.8	0.1	3.8
<u>Early Harvest:</u>							
A72331-14	3.2	-	3	6	2.8*	1.0*	1.8**
A72331-17	2.8	-	8**	8	-	1.8**	2.5*
A72687-11	2.8	-	2	8	2.3*	0.9	-
A73145-5	2.8	-	2	4**	0	0	4.2
A73414-1	3.2	-	2	3**	0.3	0.2	3.9
A(LR)22-2	2.5	-	8**	8	0	0.3	2.8
NDA8694-3	2.5	-	9**	9**	0.8	0.1	-
NDA9249-3	2.8	-	4	6	-	0.1	-
Atlantic	3.0	-	2	3**	0.7	0.4	-
Norgold	2.3	-	9**	9**	0	0.1	-
Pioneer	2.8	2.8	2	8	3.3**	1.6**	2.2**
BelRus	2.8	-	2	7	4.7**	2.9**	-

*Significantly different from Russet Burbank at the 5% level.

**Significantly different from Russet Burbank at the 1% level.

1/Based on a modified Barret Horsfall rating system 0 = no symptom, 9 = 95% dead.

2/Based on a 0-5 scale with 0 = no symptom, 5 = maximum symptom or in the case of dormancy 0 = no sprouting, 5 = maximum sprouting after 4 mo storage at 50F.

3/Storage tests not completed until mid-March. These are 78-79 test results.

ID-OR Table 4. Distribution of Selections, Varieties, and Seedlings - 1979.

LOCATION	COOPERATOR	NUMBER	LOCATION	COOPERATOR	NUMBER
<u>Clones:</u>					
Arizona	W. Pew	1	New York	B. Brodie	10
California	K. Foster	1	Ohio	F. Lower	3
	R. Voss	82		J. Pisarcyk	1
Canada	D. Lynch	77	Oregon	J. Burr	2
	W. A. Russell	5		G. Carter	4
Florida	J. Shumaker	1		R. MacLaughlin	8
Germany	J. Lange	53		C. Stanger	51
				G. Vogt	3
Idaho	R. Ohms	1	Pennsylvania	P. Grun	3
	J. Peterson	8	Tennessee	T. Johnson	1
	L. Williams	6		C. Mullins	2
	A. Finley	16	Texas	J. C. Miller, Jr	14
Maine	H. Murphy	1	Utah	L. Anderson	3
	T. Snyder	2			
Maryland	R. Webb	17	Washington	B. Dean	29
Michigan	R. Chase	13		L. Hiller	6
Minnesota	F. Lauer	7		M. Martin	40
New Jersey	J. Adams	1	Wisconsin	R. Hanneman	2
				J. Mitchell	2
				J. Schoeneman	11
			Wyoming	K. Bohnenblust	3
<u>Seedling tubers:</u>					
<u>Families</u>					
California	R. Voss				48
Colorado	J. Twomey				136
Germany	J. Lange				12
North Dakota	R. Johansen				69
Texas	J. C. Miller, Jr.				79

INDIANA

H. T. Erickson, R. Grenard, P. M. Hasegawa

Seedling and Clonal Evaluation

All clonally propagated selections were evaluated on high organic muck soil in northern Indiana, whereas seedlings were grown and selected on mineral soil. A total of 65 advanced lines were grown in 20-hill plots and 84 first year clonal selections were evaluated as 5-hill entries.

One advanced clone, 75-320-1, included in a replicated trial, yielded nearly as well as Red Pontiac, over 400 cwt/acre. It chips satisfactorily and has excellent specific gravity for this area (19 + percent), but hollow heart might be a problem.

Somewhat over 350 seedling selections were made and tested for specific gravity. All had been grown as seedling transplants in peat bands, seeded in the greenhouse in early April and field planted about May 10.

All clonally propagated selections are tested for soluble protein following the refractometer method which has been in use here for several years. High protein selections are routinely being used as parents in the breeding program.

Tuber Tissue Culture

Conditions were studied for optimum plant generation from tuber discs grown in culture. The highest incidence of morphogenesis occurred at 18° C, in the light. Storage time up to 20 weeks at 4° C had no effect, but it is important to avoid the pith area as very few shoots are regenerated from that part of the tuber. Auxin was not essential in the medium but a low NAA concentration aids explant survival. Cytokinin is essential for explant survival and GA is necessary for both shoot initiation and subsequent development. Details of this research are being published.

Potato Species

Solanum chacoense and S. berthaultii accessions included clones with notably high tuber protein levels. These were crossed and the F₁ generation field grown. A small number of tubers were produced which are being analyzed for protein. The hybrid plants were exceedingly fertile and large numbers of seed were harvested for F₂ generation studies and for crosses with S. tuberosum.

Potato Variety Trials
1979
University of Kentucky - Lexington

C. R. Roberts
Extension Specialist
Vegetable Crops

Planting Date: April 19, 1979
Spacing: 12" x 36"
Herbicide: Eptam
Harvest Date: August 16-17
Replications: 4 randomized blocks
Fertilizer: 1000# 16-16-16/A

Variety	Cwt/A Yield	Specific Gravity	Chip Color*	Undesirable Color*	% Solids*	Chip Defects*
Kennebec	406	1.0725	61	11	-	2
Russet Burbank	348	-	-	-	-	-
ND8891-3	331	(1.082)	60	10	16.2	3
Norchip	325	(1.0755)	63	5	14.0	4
Oneida	313	-	63	5	-	2
B8433-4	273	(1.065)	62	7	-	0
Atlantic**	267	1.0845	64	5	13.8	0
B8486-1	244	-	-	-	-	-
Norgold Russet	238	-	-	-	-	-
B7154-6	238	(1.062)	62	6	12.0	2
B7154-10	227	(1.064)	65	3	-	0
B8615-2	221	(1.075)	64	7	-	3
B8812-15	215	-	-	-	-	-
B8356-1	209	(1.0665)	60	15	-	0
Superior	203	(1.074)	62	7	-	8
B8498-9	191	-	63	6	-	0
BelRus**	139	-	-	-	-	-

* Chipping data furnished by Frito-Lay Company personnel in Louisville.

** Planted 2 weeks later than other varieties.

<u>Variety</u>	<u>Seed Source</u>
Norchip	Tri-Drees Farms, Box 13, Grand Forks, ND
Oneida	Tri-Drees Farms, Box 13, Grand Forks, ND
ND-8891-3	Tri-Drees Farms, Box 13, Grand Forks, ND
Kennebec	Fayette Seed Store, Lexington, KY
B-8498-9	Dr. Raymon Webb, USDA, Beltsville, MD
B-8812-15	Dr. Raymon Webb, USDA, Beltsville, MD
B-7154-6	Dr. Raymon Webb, USDA, Beltsville, MD
B-8356-1	Dr. Raymon Webb, USDA, Beltsville, MD
B-8433-4	Dr. Raymon Webb, USDA, Beltsville, MD
B-7154-10	Dr. Raymon Webb, USDA, Beltsville, MD
B-8615-2	Dr. Raymon Webb, USDA, Beltsville, MD
B-8486-1	Dr. Raymon Webb, USDA, Beltsville, MD
Russet Burbank	Bula Potato Farms, Antigo, WI
Norgold Russet	Ryan Farms, Gilby, ND
Superior	Sunnydale Farms, Bryant, WI
Atlantic	Ohio State University, Columbus, OH
Belrus	Stark's Farms, Inc., Rt. 3, Rhinelander, WI

Potato Production Costs (Per Acre)

For Chipping Potatoes

Cash Costs:

Seed 17 cwt/A	\$85. to \$126.00
Fertilizer 1500#/A	85.00
Herbicides	18.00
Insecticides	25.00
Fungicides	8.50
Land Preparation	15.00
Planting (Tractor & Labor)	15.00
Cultivation	25.00
Harvesting (Tractor & Labor)	<u>65.00</u>
	<u>\$382.50</u>

Overhead Costs:

Machine Depreciation	150.00
Interest on Machinery	25.00
Management Charge	50.00
Taxes	4.80
Insurance	<u>50.00</u>
	<u>\$279.80</u>

cash costs 382.50
total all costs \$662.30

Return Potential Based on Various Yields and a
Contract Price of \$4.25 Per Cwt. FOB at The Farm

<u>150 Cwt/A</u>	<u>200 Cwt/A</u>	<u>250 Cwt/A</u>	<u>300 Cwt/A</u>
\$637.50	\$850.00	\$1062.50	\$1275.00
<u>-662.30</u>	<u>-662.30</u>	<u>-662.30</u>	<u>-662.30</u>
<u>\$-24.50</u>	<u>\$187.70</u>	<u>\$ 400.20</u>	<u>\$ 612.70</u>

MAINE

S. S. Leach, Raymond E. Webb and David Wilson

Resistance to Fusarium Tuber rot (Fusarium roseum 'Sambucinum' and Fusarium solani 'Coeruleum'). Inoculum for this test was grown on potato dextrose agar. Spores were washed from seven day old cultures and adjusted to 50,000 per ml. The tubers of the test clones were inoculated with a hypodermic syringe midway between the bud and stem ends. The inoculum (100 spores) was injected into the tubers 7 mm below the tuber surface. The inoculated tubers were stored in a controlled environment room maintained at 55°F (13°C) and 95 percent relative humidity for 21 days. At the end of the storage period, the tubers were removed and scored for tuber rot development and amount of sprouting. The degree of rot in a tuber was determined by cutting through the inoculation sites and observing the degree of infection. This year we began using B7200-33 as the resistant standard and Atlantic as the susceptible standard. B8881-5 and B8943-4 showed high degrees of resistance to both Fusarium species. Most of the clones tested showed less disease when inoculated with F. solani 'Coeruleum' than when inoculated with F. roseum 'Sambucinum'. B8934-4 and B8977-2 developed the fewest and shortest sprouts when stored at 55°F for 4 weeks (Table 1).

Maine Table 1. Varieties and clones tested in Fusarium tuber rot resistance-sprouting trials -- 1979-1980.

<u>Variety or Clone</u>		Fusarium Rating <u>1/</u>		<u>Sprouting 2/ Rating</u>
		<u>F. roseum 'Sambucinum'</u>	<u>F. solani 'Coeruleum'</u>	
Variety				
Atlantic	0		5	0
Clones				
B7200-33	8		8	0
B8848-42	1		7	0
B8881-5	8		7	0
B8902-3	0		6	0
B8934-4	2		8	3
B8939-8	1		7	0
B8943-4	6		8	0
B8966-3	1		1	0
B8977-2	3		6	5

1/ Rating 0-9: 9 = no disease; 0 = severe disease systems.

2/ Rating 0-9: 9 = no sprouts; 5 = pipping; 0 = sprouts over 5 cm long.

MAINE - 1979

Hugh J. Murphy and Leigh S. Morrow

Cooperative variety trials were conducted during 1979 at Presque Isle, Grand Isle, and Newport, Maine. Soil and weather conditions during mid-May at planting were dry and warm; however, emergence at some locations may have been affected by seven days of rain at the end of May. Rainfall was below average for the months of June and July but normal for August.

Plots at all test sites were single rows, 25 feet long and replicated six times per variety, with the exception that the Newport trials were replicated five times. Planting, killing, and harvesting dates, seedpiece spacing, and fertilization rates used at each location are presented in Maine Table 4.

Yields and specific gravities for all varieties grown at all Maine locations are presented in Maine Table 1. The ten highest yielding varieties considering the all-location average in descending order were: W564-3A, Kennebec, AF92-3, BR5991-WV16, F67128, A68678-1, F68036, Russet Burbank, W718, and Snowchip. The ten highest varieties in specific gravity were: AF186-2, B6987-184, BR7088-18, Atlantic, Belchip, CD23-1, CD106-16, Denali, AK28, and A68678-1. Half of the 54 varieties tested were below the 1.075 minimum required by processors in Maine.

Tuber size distribution determinations of U.S. #1 and U.S. #1 (size A) are presented in Maine Table 2. Many varieties produced a high percentage of tubers below 2½ inches probably due to the lack of moisture during July. It follows that very few varieties yielded any oversized (>4"). Growth cracks, air cracks, misshapen, and knobby tubers were not as prevalent as in the previous season, although Russet Burbank was the exception, producing many misshapen tubers.

Results of the first chipping and french fry color tests with tubers from 50° F storage are presented in Maine Table 3. Since only two varieties, C7232-4 and F69026, had acceptable color (<7.0), 1979 was a very poor year for chips. Although chip colors were poor, 36 of the 43 varieties tested did have good french fry color. French fry texture of all varieties was unsatisfactory (>1.2). Several varieties had excellent fry color. These were: Superior, AF186-5, B6969-2, C7232-4, and F69026.

Complete details of the Maine cooperative variety trials are presented in the 1979 Northeastern Potato Variety Trial report which is made available from cooperators in each State and also from the Public Information and Central Services (PICS), University of Maine; Orono, Maine 04469.

Maine Table 1. Yield and specific gravity of potato varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1979.

Variety	Presque Isle		Grand Isle		Newport	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
Alaska Red	256	1.069	319	1.062		
Atlantic					169	1.085
Batoche	276	1.072	350	1.064	155	1.067
Belchip					189	1.085
Buckskin	340	1.075	349	1.083	207	1.077
Butte	326	1.071	315	1.082	167	1.076
Campbell 11					108	1.079
Campbell 13					146	1.078
Centennial Rus.	295	1.076	296	1.078		
Cobbler	167	1.070	273	1.076		
Croatan	280	1.064	300	1.059	183	1.069
Denali	254	1.078	266	1.079	224	1.088
Jemseg	166	1.079	269	1.075		
Katahdin	354	1.073	313	1.077	225	1.070
Kennebec (Med.)	324	1.068	350	1.067	290	1.072
Kennebec (M. Late)	366	1.070	402	1.080		
Norchip					170	1.076
Norgold (Late)	130	1.062	226	1.068		
Oneida	277	1.069	290	1.067	165	1.068
Russet Burbank	272	1.071	347	1.083		
Snowchip	346	1.072	336	1.091	226	1.074
Superior	185	1.076	294	1.077	157	1.077
Superior (Late)	261	1.067	317	1.068		
A68678-1	326	1.082	309	1.083		
AF92-3	356	1.066	366	1.077		
AF186-2					145	1.089
AF186-5	244	1.078	303	1.084	202	1.080
AF205-9	272	1.074	375	1.074	138	1.081
AF223-1	265	1.066	330	1.065		
AF238-21	290	1.072	378	1.070	131	1.077
AK6-5	94	1.070	187	1.080	175	1.079
AK24-3	208	1.062	267	1.070		
AK25	214	1.066	268	1.071		
AK28	272	1.076	287	1.088		
B6969-2	153	1.069	287	1.071	207	1.071
B6987-184	302	1.088	303	1.090		
B7802-2					188	1.073
BR5991-WV16	337	1.075	350	1.084		
BR7088-18					178	1.086
BR7090-17					186	1.074
BR7093-23					178	1.069
C7232-4	150	1.081	295	1.082	90	1.078
C72107-13A	305	1.074	344	1.080	199	1.073
C7356-13A	320	1.074	354	1.087	188	1.081

Maine Table 1 - continued

Variety	Presque Isle		Grand Isle		Newport	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
C7358-14A	250	1.076	302	1.082	168	1.077
C7358-26A	299	1.073	377	1.067	159	1.075
CD23-1					154	1.083
CD106-16	345	1.079	387	1.085	175	1.082
F67128	307	1.063	351	1.077		
F68036	320	1.069	371	1.080	244	1.072
F69016	313	1.079	367	1.084	208	1.072
F69026	142	1.075	328	1.070	159	1.072
W564-3A	373	1.067	415	1.073		
W718	265	1.060	401	1.058	257	1.064
Bayes L.S.D. (0.05)	32	0.002	47	0.005	44	0.004

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1979.

Variety	Presque Isle		Grand Isle		Newport	
	1-7/8 to 4 inches	2-1/2 to 4 inches	1-7/8 to 4 inches	2-1/2 to 4 inches	1-7/8 to 4 inches	2-1/2 to 4 inches
Alaska Red	88.4	11.4	83.2	16.5		
Atlantic					94.9	53.3
Batoche	93.7	22.0	92.7	36.7	92.2	28.7
Belchip					96.0	57.7
Buckskin	96.3	82.0	95.4	64.0	93.5	44.0
Butte	44.3% 4-10 oz.		52.8% 4-10 oz.		42.5% 4-10 oz.	
Campbell 11					94.1	45.9
Campbell 13					93.9	43.5
Centennial Rus.	92.1	40.1	54.4% 4-10 oz.			
Cobbler	84.9	12.7	94.4	31.8		
Croatan	95.4	44.0	88.2	42.6	92.2	40.9
Denali	94.0	44.9	92.0	35.8	92.6	42.4
Jemseg	94.7	37.1	95.4	65.0		
Katahdin	96.3	79.3	97.0	62.1	95.1	53.9
Kennebec (Med.)	97.6	64.6	88.6	36.9	96.6	56.3
Kennebec (M.Late)	97.9	72.1	95.1	65.7		
Norchip					89.8	29.3
Norgold (Late)	74.4	2.7	86.4	16.0		
Oneida	91.7	21.2	91.4	36.5	92.1	43.9
Russet Burbank	52.7% 4-10 oz.		57.8% 4-10 oz.			
Snowchip	95.1	27.4	92.2	29.0	92.7	36.8
Superior	91.1	19.4	93.1	37.4	93.0	32.8
Superior (Late)	95.7	50.5	87.1	33.1		
A68678-1	95.9	40.5	52.8% 4-10 oz.			
AF92-3	97.2	55.3	95.2	49.6		
AF186-2					88.5	14.0
AF186-5	90.3	8.2	92.0	42.1	95.0	26.6
AF205-9	93.5	26.8	91.0	37.5	88.0	15.4
AF223-1	94.5	35.8	88.9	35.0		
AF238-21	96.7	45.8	95.6	35.9	88.9	24.7
AK6-5	68.4	0.4	83.0	11.3	84.1	13.0
AK24-3	96.7	46.7	94.8	31.1		
AK25	88.2	25.0	91.5	31.1		
AK28	96.9	46.2	97.0	51.6		
B6969-2	85.2	12.3	89.8	29.4	95.9	53.8
B6987-184	96.4	82.6	97.6	59.1		
B7802-2					93.1	44.8
BR5991-WV16	95.0	41.8	93.6	41.2		
BR7088-18					93.9	43.0
BR7090-17					93.8	38.4
BR7093-23					90.1	34.3
C7232-4	92.0	16.9	96.0	52.4	87.0	18.1

Maine Table 2 - continued

Variety	Presque Isle		Grand Isle		Newport	
	1-7/8	2-1/2	1-7/8	2-1/2	1-7/8	2-1/2
	to 4 inches					
C72107-13A	95.3	76.8	94.0	46.4	91.5	33.5
C7356-13A	98.1	70.2	97.5	61.3	94.1	55.8
C7358-14A	95.5	35.6	86.7	35.7	92.1	43.1
C7358-26A	95.4	30.9	91.7	35.1	94.2	27.8
CD23-1					93.4	21.6
CD106-16	97.2	82.5	94.1	51.7	88.1	24.0
F67128	97.0	59.4	95.6	54.1		
F68036	97.1	59.7	96.2	56.2	51.9%	4-10 oz.
F69016	97.0	38.3	95.5	50.4	50.3%	4-10 oz.
F69026	92.7	19.0	95.8	45.4	91.4	33.7
W564-3A	50.7%	4-10 oz.	98.2	60.0		
W718	94.3	41.3	79.4	34.8	94.4	59.7

Maine Table 3. Chip color and french fry color and texture indices for potato varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1979.

Variety	Presque Isle			Grand Isle	Newport
	Chip Color ¹	French Color ²	Texture ³	Chip Color ¹	Chip Color ¹
Alaska Red	10.0	3.9	2.4	10.0	
Atlantic					7.2
Batoche	9.4	2.8	2.3	8.9	9.7
Belchip					6.7
Buckskin	7.7	1.8	2.0	8.2	8.2
Butte	8.8	2.9	2.1	9.4	9.0
Campbell 11					5.6
Campbell 13					6.8
Centennial Russet	8.7	3.6	2.5	10.0	
Cobbler	7.7	2.0	1.8	9.6	
Croatan	7.6	1.9	1.9	7.6	7.4
Denali	8.7	1.9	2.3	9.0	7.7
Jemseg	7.9	1.6	2.4	9.3	
Katahdin	8.1	2.7	2.2	8.4	8.5
Kennebec (Med.)	8.6	2.3	1.8	8.5	
Kennebec (M.Late)	8.1	2.2	1.7	8.9	8.3
Norchip					7.6
Norgold (Late)	8.7	2.7	1.7	9.7	9.7
Oneida	8.5	1.8	2.0	8.2	9.1
Russet Burbank	8.5	2.7	2.3	8.2	
Snowchip	7.0	1.5	2.0	7.8	7.9
Superior	7.5	1.2	2.2	8.2	8.5
Superior (Late)	8.6	2.7	1.9	8.0	
A68678-1	8.2	2.6	2.5	8.5	
AF92-3	9.7	2.7	2.0	8.9	
AF186-2					6.2
AF186-5	7.0	1.0	2.2	7.6	7.5
AF205-9	8.2	1.5	1.9	8.0	7.1
AF223-1	8.1	1.3	1.7	7.9	
AF238-21	7.8	1.8	2.1	8.8	6.9
AK6-5	7.2	1.0	1.5	8.8	8.8
AK24-3	9.2	3.1	2.2	9.0	
AK25	8.8	2.8	1.9	9.3	
AK28	6.7	2.0	2.3	8.4	
B6969-2	8.1	1.2	2.1	9.3	8.4
B6987-184	7.1	1.6	2.1	7.7	
B7802-2					8.4
BR5991-WV16	7.6	1.8	1.5	8.6	
BR7088-18					6.6
BR7090-17					6.2
BR7093-23					7.4
C7232-4	5.2	1.0	2.2	5.2	5.7

Maine Table 3 - continued

Variety	Presque Isle			Grand Isle	Newport
	Chip Color ¹	French fry Color ²	Texture ³	Chip Color ¹	Chip Color ¹
C72107-13A	8.0	2.5	2.2	8.6	7.5
C7356-13A	10.0	2.9	2.2	9.8	8.6
C7358-14A	7.4	1.4	2.2	8.1	7.6
C7358-26A	9.1	2.2	2.0	9.5	8.0
CD23-1					7.8
CD106-16	9.0	3.2	2.0	9.1	8.8
F67128	10.0	4.0	1.9	10.0	
F68036	10.0	3.6	2.0	10.0	9.7
F69016	7.6	1.8	2.3	8.4	8.6
F69026	5.8	1.0	1.3	7.4	7.2
W564-3A	9.5	3.2	2.0	9.7	
W718	8.5	2.0	2.4	8.2	7.8
Bayes L.S.D. (0.05)	0.7	0.6	0.5	0.7	1.1

¹Chips with lower indices are lighter in color as read on PCII Reference Chart 1206-U.

²French fries with lower indices are lighter in color as read from USDA Color Standards for Frozen French Fries.

³Lower texture indices indicate a mealier texture.

Maine Table 4. Pertinent information about the Maine Cooperative Potato Variety Trials - 1979.

Location and Maturity Season	Date Planted	Date Killed	Date Harvested	Fertilization	Spacing
<u>Presque Isle</u>					
Early & med. early varieties	May 14	August 10	August 23	130-130-130	<u>1/</u>
Medium varieties	May 14	August 23	September 5	130-130-130	<u>1/</u>
Medium late varieties	May 14	August 28	September 12	130-130-130	<u>1/</u>
Late varieties	May 14	September 4	September 17	130-130-130	<u>1/</u>
Russet & long type varieties	May 14	September 8	September 17	130-130-130	<u>2/</u>
<u>Grand Isle</u>					
Early & med. early varieties	May 17	August 15	August 27	150-225-225	<u>1/</u>
Medium varieties	May 17	August 25	September 11	150-225-225	<u>1/</u>
Medium late varieties	May 17	August 29	September 11	150-225-225	<u>1/</u>
Late varieties	May 17	September 4	September 27	150-225-225	<u>1/</u>
Russet & long type varieties	May 17	September 15	September 27	150-225-225	<u>2/</u>
<u>Newport</u>					
A11 varieties	May 23	September 6	September 20	140-140-140	<u>3/</u>

¹Seedpieces of all varieties spaced 8 inches apart.

²Seedpieces of Butte and Russet Burbank spaced 16 inches apart.

Seedpieces of AK28 and W564-3A spaced 12 inches apart.

Seedpieces of A68678-1 spaced 14 inches apart.

Seedpieces of Centennial Russet spaced 10 inches apart.

A11 other seedpieces spaced 8 inches apart.

³Seedpieces of Butte spaced 16 inches apart.
Seedpieces of F69016 spaced 12 inches apart.
A11 other seedpieces spaced 8 inches apart.

Maine - 1979

Alvin F. Reeves and Robert B. Long

Potato Breeding

Crossing and seedling production: Sixty-four parental clones were intercrossed in sixty-five combinations to produce 244 fruits containing 15,200 seeds. F_2 seeds from 12-hill plantings totaled 398,000. Seeds from 48 family lines were planted in the greenhouse in late May. From the resulting 7,620 seedlings, 6,760 tubers were harvested.

Seedling selection: A total of 313 selections were saved from approximately 44,000 single-hill seedlings. From the 210 12-hill plots, 15 were selected for further testing. Sixty-one third-year selections were tested in 20-hill, 60-hill, and disease plots.

Disease tests: In cooperation with Drs. Frank Manzer and Richard Storch, a number of seedlings were tested for resistance to late blight, early blight, common scab, acid scab, leafroll, verticillium, virus Y, virus X, net necrosis, and hollow heart. Selected seedlings were also sent to Dr. Brodie for golden nematode testing, to Dr. R. Young for late blight testing, and to Dr. Banville for rhizoctonia testing.

Resistance to virus X was found in 40/193; to common scab in 81/204, to net necrosis in 162/204, to acid scab in 40/71, to late blight in 47/87, to golden nematode in 2/14, to verticillium in 22/116, to rhizoctonia in 17/50, to early blight in 5/80, and to hollow heart in 22/32. Leafroll and virus Y tests are not yet completed.

Four-hill plots: Thirty-five of 831 four-hill clones were selected for retesting in 12-hill plots in 1980. None of the 28 selections from 1978 were saved from the 12-hill plots in 1979.

Seed-spacing studies: The newly released variety, Allagash Russet, was grown at 8", 10", 12", 14", and 16" spacings. In actual values, the 12" spacing had the greatest total yield and yield of tubers over 1-7/8", although it also had the lowest specific gravity (1.077). The only statistically significant difference, however, was in percent of tubers over 1-7/8", the 8" spacing had less than all of the others. No hollow heart was found in the 8" spacing; 1.5% was found in the 10 and 12"; and the 14 and 16" spacings had 5.8 and 3.5%, respectively.

Sencor spray damage: Five seedling selections which had shown drastic drops in yield in 1978 (when Sencor was used) as compared to 1977 (when premerge was used) were tested for reaction to Sencor.

Only one, AF 41-2, showed any foliage symptoms. It was also the only one to show statistically significant reductions in yield and specific gravity. Yields of AF 288-1 were reduced by 33 Cwt/A, but this was not statistically significant. Apparently there is some other reason for the yield drops in 1978.

Yield tests: One hundred fifty-four advanced selections were tested in nine separate tests. Twenty-three out-yielded check varieties, 46 had higher specific gravities, and two were better for both qualities. Each selection in each test comprised four replications of 20 hills each planted in a randomized complete block design. Fertilizer in the form of 14-14-14 was applied at the rate of 110 lbs N/A. Seedpiece spacing was 10 inches in 34 inch rows.

Maine Table 1 presents data from a yield test of seventeen new varieties and advanced selections from several breeding programs collected by Dr. R. L. Nickeson, and grown at Aroostook Farm, Presque Isle, Me. ND 8891-3 out-yielded all others in this test. Next highest in yield were Kennebec, MN 4536, Buckskin, and Belchip. Highest specific gravity was in a North Carolina selection, 72C15-20. Next highest was Belchip, then A 68678-1, followed by Buckskin, BelRus, and Tobique. Lightest french fry colors were found in Belchip and Norchip. Others with good quality were ND 8888-2, 72C15-20, Penn 71, Wauseon, A 68678-1, Snowchip, Oneida, and Jemseg; 72C15-20 was the only one which reconditioned well from cold storage.

Twenty-hill plots: Thirty-one additional newly named varieties and advanced selections from other breeding programs were evaluated in 20-hill plots at Aroostook Farm. The highest yielding selection was Nebraska S1-3; then was W 718, G68198-5, Michibonne, and A63.71-1. Next was NY 65, along with several others. Highest specific gravity (1.106) was in Denali; then came W 744, 6546-6pE2, W 752, and Trent. Next was NY 65 along with a few others. French fry colors were good in Trent, MN 7973, MN 8586, G6880-1, 6546-6pE2, Croatan, and NDA8694-3. Six selections reconditioned well: 6546-6pE2, W 744, Trent, W 703, A71.72-1, and G6880-1. Rideau had the nicest looking tubers, although its yield and specific gravity were low.

New selections under consideration for release: AF 193-4 was released as "Allagash Russet". It is a mid-early maturing oblong russet with generally good yields, moderate scab resistance, excellent chipping qualities, and immunity to net necrosis. AF 41-2 is under consideration for naming in 1980. It is an early, round, buff colored potato with very high yields. AF 186-5, an oblong to long white, is golden nematode resistant, excellent for chips, and medium maturing in southern New England. CC 26-1a is a mid-season round white, all purpose variety which is higher in specific gravity and higher yielding than Katahdin.

Maine Table 1. Summary of Breeders Yield Test¹⁴ at Aroostook Farm, Presque Isle - 1979.

Pedigree	Cwt/A USL ¹¹	Percent USL ¹²	Specific Gravity ¹²	Appearance ¹³	Color ¹⁴	Slope ¹⁵	Size ¹⁶	Set ¹⁷	Maturity ¹⁸	Fertilizer ¹⁹	French Fry Color ¹⁰	Texture II	French Fry Color ¹⁰	Texture II	French Fry Color ¹⁰	Texture II	French Fry Color ¹⁰	Effects L3	- 79 -			
Batoche	294	96.8	79	4	R	R (F)	SL	/+	M (L)	0	5.5	2.5	8.0	2.4								
Belchip	341	98.5	93	3	W	HR	0	/	ME	-	3.0	1.5	6.5	1.8								
BelRus	220	94.9	87	3+	BN	R	M	/+	M (L)	0	5.2	2.3	7.6	2.0								
Buckskin	346	97.2	88	3+	R	R	S	/+	M	+	5.9	1.9	7.0	2.0	DSD							
Centennial Rus.	261	95.9	85	3+	BCN	ROF	SL	-	ML	-	8.6	2.6	10.0	2.2	GC							
Jemseg	258	97.7	79	3+	W	R	SM	/	E	-	4.1	1.6	6.8	2.5	GC							
Katahdin	299	98.1	77	3	W	ROF	L	/	M (L)	0	5.8	2.1	7.6	2.3	DSD							
Kennebec	359	99.0	84	3-	W	R	SM	/	ME	-	5.4	1.8	5.7	2.0								
Norchip	289	97.7	84	3+	W	R	SM	/	M (L)	0	3.1	2.2	7.2	2.0	GC							
Oneida	264	91.3	82	3	WN	R	R	+	ME	-	3.9	1.5	5.8	2.0	GC							
Penn 71	307	97.9	78	3-	W	RF	SL	/	M	+	3.5	2.3	7.0	2.0	Scab							
Russet Burbank*	295	97.4	86	2	R	L	SL	-	(M) L	0	6.1	2.0	8.5	2.0								
Snowchip	323	96.4	82	3+	BN	R	SM	+	M	0	3.9	1.3	5.8	2.0	DSD							
Superior	280	98.4	82	3	WN	R	SM	+	E	/	6.0	1.8	6.7	2.0	DSD							
Tobique	287	97.0	87	3	WSp1	RF	SL	/+	M	+	5.0	1.5	6.5	2.0	DSD							
Wauseon	316	98.3	76	3	CN	R	SL	/+	M	0	3.8	2.2	7.8	2.0	DSD							
A 68678-1	310	96.2	90	4	LR	OL	SL	/	M (L)	0	3.9	2.6	6.7	3.0	points							
B 6969-2	317	96.6	72	4+	CN	R	S	/+	M (E)	-	5.0	1.6	8.0	2.2								
72C15-20	234	97.8	99	2+	W	RF	SL	-	L	0	3.5	1.0	4.0	1.8	DSD							
MN 4536	350	97.9	69	4	mRed	RO	M	/+	ME	0	7.5	2.4	10.0	2.2	points							
ND 8888-2	316	98.0	80	3	W	R	SM	+	M	+	3.3	1.6	7.4	2.0								
ND 8891-3	402	97.1	80	3	W	ROF	SL	+	M (L)	0	6.5	2.5	7.1	2.0	points							

- * Seedpiece spaced 20" apart.
- 1 US-1 includes all tubers larger than 1-7/8 inches.
- 2 Specific gravities were determined by the air-water method and are the actual value times 1000 minus 1000.
- 3 Tuber appearance ratings are based on a scale of 1 to 5, with 1 = poorest.
- 4 R = russet; W = white; B = buff, C = cream; N = netted; L = light; M = medium; H = heavy; spl = splashed with pink.
- 5 R = round; 0 = oblong; L = long; F = flat.
- 6 S = small; M = medium; L = large.
- 7 + = many; / = moderate; - = few.
- 8 M = medium; E = early; L = late.
- 9 Blank = did not flower; 0 = no fruit; - = few fruits; / = moderate number of fruits; + = many fruits.
- 10 French fry color is based on PSII scale where 1 = white and 10 = very dark.
- 11 French fry testure is based on a scale of 1 to 3, where 1 = mealy and 3 = soggy.
- 12 The first french fry data are from tubers stored three months at 50° F; the second set of data are from tubers stored for four months at 38° F, then reconditioned for three weeks at 70° F.
- 13 DSD = deep stem end; GC = growth cracks; points = pointed ends of tubers.
- 14 Test planted May 18; vines killed Sept. 11 (116 days). Field notes were made on the first replication only; cooking tests were performed on the first two replications (figures are averages of those two). Yield, percent US-1, and specific gravity figures are averages of all four replications.

MINNESOTA POTATO BREEDING PROGRAM

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In the routine breeding program, selection continued for yielding ability, specific gravity, chipping from 43F storage, and resistance to three diseases (Verticillium wilt, common scab and late blight).

Seedlings: We grow about 30,000 of our seedlings each year. The major emphasis in the choice of parents is on the basis of chipping ability, specific gravity, resistance to common scab, and russetting. A substantial number of seedlings are also grown to develop S. andigena and S. phureja as sources of new breeding stocks. We are also growing about 10,000 "B" sized seedling tubers from the USDA program at Beltsville, Maryland and 4,000 tubers from the Cornell program. Selections are made at Crookston (9 acres) and at Grand Forks. Emphasis in selection is on yield, specific gravity, hollow heart and tuber appearance.

Replicated yield trials: Yield trials were conducted at three locations in the RRV, Grand Forks, Baker and Argyle, on the irrigated sands at Becker and Park Rapids, on peat at Anoka, and on sandy loam at Grand Rapids. They were planted in 20-hill plots in two replications. Conditions were excellent for hollow heart as well as for common scab at several of the locations.

A total of up to 21 advanced selections and 16 named varieties were included. Table 1 gives the results at three locations in the RRV and Table 2 gives the results at Becker on the irrigated sands. Ten of 20 advanced selections were retained for further testing. These selections and some of their characteristics based on data collected thus far are listed below.

Color	Code	Tuber shape	Specific gravity	Chipping	Resistance to		
					Scab	Late blight	Hollow heart
red	4536	blocky	low	no	medium	yes	high
dark red	8742	blocky	low	no	medium	yes	medium
red	8757	blocky	low	no	high	yes	medium
dark red	8758	blocky	low	no	high	yes	medium
dark red	8777	round	low	no	medium	yes	high
white	7973	long	medium	marginal	high	no	high
white	8224	round	high	yes	medium	no	medium
white	9234	round	medium	marginal	high	yes	high
russet	8586	oval	medium	yes	high	no	high
russet	9319	blocky	medium	marginal	high	yes	high
russet	9569	long	medium	marginal	high	no	high
russet	9648	blocky	medium	marginal	high	yes	high

Of the newer selections in the program, the most outstanding red was MN8777 with a very attractive tuber type and dark red color. It also has the most vigorous top growth of any of the entries. The most outstanding russets were MN9319 and MN9648, both of which have attractive tuber type and russetting. These selections are resistant to hollow heart. The most outstanding white was ND8891-3 which will be named some time this year by North Dakota.

Chipping from 43F storage: This series of evaluation continued in cooperation with the RRV Potato Processing Laboratory. The data given below is from the 1979 crop grown at Grand Forks and includes only the selections retained for testing in 1980. Chip tests were made from 43F storage. Agtron values of 40 or more are acceptable, 35-39 are marginal, while those of 34 or less are unacceptable. The Norchip scores serve as a check. The most advanced selection with acceptable agtron values and high specific gravity is 8224. The highest score observed was 53. In addition to these, seedling selections from Crookston, Grand Forks, and from Grand Rapids are also being chipped both from 43F and 65F.

Selections	Number of selections with agtron values from 43F storage			Norchip check agtron
	Over 40	35-39	Less than 35	
2-year-old	18	31	66	40
3-year-old	4	2	3	40
4-year-old or older	1	4	7	45

Protein content: Selection for protein content continued in derivatives of both S. phureja and S. andigena. Significant variation in protein content has been observed in both species. Protein content is expressed on a dry weight basis using a conversion factor of 7.52. The data given below represents evaluation of selection in the breeding program.

Genetic source	Number of seedlings	% Protein content	
		Average	Range
Phureja-tuberosum	45	7.8	6.3-11.4
Andigena	56	8.1	5.4-11.2

Up to the present time, the crosses available have involved only one parent with increased protein content. Tuber yield of selections from these crosses approached but did not exceed cultivar checks. We are now crossing parents from the two genetic sources above.

Verticillium wilt: In cooperation with Neil Anderson of Plant Pathology, 376 selections were tested for Verticillium wilt resistance at Becker. A similar plot at Grand Forks was water damaged. Up to 15 tubers per selection or check were cut in each plot to estimate veinal necrosis in the tubers. The results are given as follows.

Number of tubers with veinal necrosis	Selection number	Norland checks	Norchip checks	Pontiac checks
0	58	5	2	4
1	233	9	8	8
2	85	4	1	3

Of the plots which had 0 out of 15 tubers with veinal necrosis, most of the plants were dead by the end of August. Some were still growing, however. The data are given below.

Condition of foliage	Selection number	Norland checks	Norchip checks	Pontiac checks
green	7	1	0	1
partially green	7	3	0	2
dead	44	1	2	1

Of the advanced selections, 8742 red, 9234 white, and 9569 russet had 0 out of 15 tubers with veinal necrosis. Only 9234 was green at the end of August.

Common scab: Throughout the breeding program, continuous pressure is applied for resistance to common scab. We have sufficient scab in the field at Crookston where the initial selections are made in the seedling populations. Perhaps, one-fourth to one-third of the seedlings which might otherwise have been selected are eliminated due to scab susceptibility. Thereafter, selections in the breeding program are tested for resistance to scab at Grand Rapids and/or Becker in cooperation with Neil Anderson of Plant Pathology. The scab readings for 365 selections tested during 1979 at Becker and/or Grand Rapids are given below.

Resistance to common scab	Selection number	Norland checks	Norchip checks	Pontiac checks
high	227	30	25	1
intermediate and low	138	1	2	21

Of the advanced selections, 7973 white, 8224 white, 8586 russet, 8742 red, 8757 red, 8758 red, 9234 white, 9319 russet, 9569 russet, and 9648 russet had resistant readings at both Grand Rapids and Becker.

Late blight: In cooperation with Howard Bissonette and Carl Eide (retired) of Plant Pathology, we tested 110 older selections for resistance to late blight. Three blocks of six plants each were used for these evaluations. Selections were considered resistant when they had less than 12% foliation on August 31 in all three blocks. The epiphytotic was effective with all check plots showing susceptible readings. The data are as follows.

Resistance to late blight	Selection number	Norland checks	Norchip checks	Pontiac checks
yes	45	0	0	0
no	55	15	12	12

Of the advanced selections, 4536 red, 8742 red, 8757 red, 8758 red, 8777 red, 9234 white, 9319 russet and 9648 russet have resistance to late blight.

Minnesota Table 1. Red River Valley replicated yield trials for 1979; Grand Forks, Baker and Argyle combined.

Variety	Color	Maturity ¹	Type ²	Marketable yield _{3,4}	Specific gravity ₅	Shape	1978 GF6 Chipping		1978 GF6 Chipping	
							43F	65F	43F	65F
Oneida	white	4.5	2.0	47.3	—	round	—	—	112	
Pontiac	red	3.5	3.0	47.1	1.073	blocky	23	33	210	
*4536	red	2.5	2.5	46.8	1.073	blocky	25	34	000	
8777	dark red	5.0	3.0	45.3	1.074	round	21	33	001	
Norchip	white	3.0	3.0	43.8	1.084	round	45	48	001	
ND8891-3	white	5.0	2.5	44.3	—	blocky	—	—	030	
8757	red	4.5	2.5	43.5	1.069	blocky	21	25	153	
Kennebec	white	5.0	3.0	42.2	1.076	blocky	29	26	221	
Norland	red	2.0	2.0	41.5	1.069	round	42	41	000	
9234	white	4.5	3.0	41.4	1.079	blocky	32	40	011	
Atlantic	white	4.0	3.0	41.3	—	round	—	—	425	
8758	dark red	3.5	2.0	41.0	1.077	blocky	25	34	016	
7973	white	4.5	2.5	39.9	1.076	long	33	35	100	
**9316	russet	5.0	3.0	39.9	1.077	round	32	38	466	
**9631	white	5.0	2.5	38.9	1.078	round	22	30	045	
**9480	purple	4.0	2.0	38.4	1.078	blocky	24	34	000	
**9430	white	3.5	3.0	38.4	1.082	long	26	32	021	
**9491	white	3.5	3.0	37.4	1.074	round	43	46	533	
Belchip	white	4.5	4.0	37.2	—	round	—	—	353	
8742	dark red	5.0	4.0	36.0	1.078	blocky	25	32	233	
Dakchip	white	3.0	4.0	35.0	—	round	—	—	014	
8224	white	4.0	3.0	34.1	1.091	round	40	50	031	
Norgold	russet	4.0	3.0	34.1	1.069	blocky	22	27	666	
9319	russet	5.5	3.5	32.3	1.079	blocky	30	34	211	
**9381	red	3.5	3.5	31.7	1.079	blocky	30	38	001	

Minnesota Table 1. (continued)

Variety	Color	Maturity ¹	Type ²	Marketable yield ^{3,4}	Specific gravity ⁵	Shape	1978 GF ⁶ Chipping	
							43F	65F
**8832	russet	4.5	4.0	31.5	1.080	blocky	25	36
9648	russet	6.0	2.5	31.3	1.078	blocky	37	41
9569	russet	3.0	4.0	31.3	1.085	long	32	38
8586	russet	2.5	2.5	30.1	1.078	blocky	37	44
Burbank	russet	5.5	4.0	29.0	1.086	blocky	25	34
**9633	white	3.5	2.5	29.0	1.081	round	38	50
Butte	russet			18.9	—	long	—	306 000

*Two locations only.
**Discarded.

¹Scale 1-6: 1, early; 6, late (GF data).
²Scale 1-5: 1, good; 5, poor (GF data).

320-hill plots.

⁴LSD₀₅ = 10.3.

⁵LSD₀₅ = 0.007.

⁶Chip color values of 35 or more are acceptable.

⁷Number of tubers with hollow heart in three 6-tuber samples.

Minnesota Table 2. Late harvested replicated yield trial for 1979 at Becker.

Variety	Color	Type ¹	Marketable yield ^{2,3}	Specific gravity	Shape	Hollow heart ⁴
*9480	purple	1.0	65.0	1.071	blocky	33
ND8891-3	white	2.0	63.4	1.079	blocky	25
Kennebec	white	2.0	62.3	1.073	long	00
*9631	white	1.5	60.2	1.083	blocky	10
Oneida	white	1.0	58.9	1.081	round	01
Michimac	white	2.0	58.4	1.069	blocky	33
9319	russet	1.5	58.0	1.077	blocky	10
8777	dark red	1.0	57.7	1.068	blocky	00
Tobique	red blotch	2.0	57.7	1.085	blocky	34
9234	white	2.0	57.0	1.079	round	10
4536	red	1.5	55.7	1.070	blocky	10
Pontiac	red	3.0	55.4	1.073	blocky	00
Norland	red	1.0	53.9	1.066	round	02
9648	russet	1.0	53.4	1.085	blocky	00
8742	dark red	2.0	53.2	1.073	blocky	01
*8832	russet	1.0	53.1	1.079	blocky	02
Atlantic	white	2.5	52.9	1.082	round	25
Belchip	white	3.5	52.7	1.091	blocky	33
Dakchip	white	3.0	51.8	1.080	long	00
8757	red	2.0	51.5	1.064	blocky	01
Jemseg	white	1.0	51.4	1.078	round	10
*9632	white	1.0	51.3	1.084	blocky	00
Norgold	russet	2.0	51.3	1.081	long	23
Norchip	white	3.0	51.0	1.093	round	01
7973	white	2.5	48.9	1.073	long	00
Burbank	russet	3.0	48.5	1.085	long	45
8224	white	2.5	48.2	1.082	round	20
*9430	white	3.0	47.2	1.079	long	12
*9633	white	2.0	46.0	1.085	round	02
*9316	russet	2.5	45.7	1.077	round	01
*9381	red	2.0	44.4	1.078	long	21
Butte	russet	2.0	43.4	1.086	long	14
*9366	white	3.0	42.7	1.072	round	10
*9491	white	3.0	40.5	1.069	round	01
8586	russet	2.0	34.8	1.074	blocky	00
Belrus	russet	2.0	27.0	1.085	long	00

*Discarded.

¹Scale 1-5: 1, good; 5, poor.

²20-hill plot, 12" between hills, 36" between rows.

Minnesota Table 2. (continued)

³LSD₀₅ = 12.3.

⁴Number of tubers with hollow heart in two 6-tuber samples.

Cooperator: Glenn Titrud.

Planted: April 26, 1979.

Harvested: August 28, 1979.

Fertilizer: 325 lbs Sul-po-Mag, 1200 lbs 8-10-30, 200 lbs 33-0-0 sidedress,
June 4 and 18, 1979

MISSISSIPPI

Anthony J. Halterlein

1979 Potato Yield Trial

The 1979 potato clone-cultivar yield trial for Mississippi was conducted at the Delta Branch of the Mississippi Agricultural and Forestry Experiment Station located in the Yazoo-Mississippi Delta area at Stoneville, MS. The trial consisted of six cultivars and ten clones that were replicated five times in a randomized complete block. The trial was planted in a Bosket fine sandy loam soil with a pH of 6.2. Ammonium sulfate, triple superphosphate and potassium sulfate supplied N, P and K at the rate of 135, 60, and 100 kg/ha, respectively. Sencor at 0.23 kg/ha was used for weed control. Plot dimensions were 1.0 m wide by 6.0 m long. Seed potatoes were planted 30 cm apart in the row on March 20. Tubers were harvested on July 2. Rainfall between planting and harvest was as follows: March, 7.0 cm; April, 26.0 cm; May, 20.2 cm; and June, 9.3 cm. No frosts or freezing temperatures occurred during the growing season. Average daily maximum and minimum temperatures were as follows: March, 20.1 C and 10.7 C; April, 22.8 C and 12.8 C; May, 26.1 C and 16.1 C; and June, 30.6 C and 20.0 C.

Mississippi Table 1. Yield and specific gravity data for six cultivars and ten clone selections of potatoes at the Mississippi Delta Branch Experiment Station. 1979.

Pedigree ^{1/}	Total yield kg/ha	Yield Size A kg/ha	% of Total Yield			Specific Gravity ^{2/3/}
	Size A	Size B	Size C			
B 8086-3	32,256	27,440 ^{4/} a	85.1	11.5	3.4	69
B 7151-4	29,120	24,864 ab	85.4	11.1	3.5	76
B 7809-5	29,008	23,744 a-c	81.8	15.0	3.2	80
Norchip	28,112	22,624 a-c	80.5	11.8	7.7	70
Atlantic	27,440	23,520 a-c	85.7	11.2	3.1	84
B 7618-6	27,104	23,408 a-c	86.4	7.6	6.0	64
Snowchip	26,768	22,400 a-d	83.7	10.7	5.6	66
B 8004-8	24,416	20,720 b-d	84.9	12.6	2.5	60
Monona	24,304	20,720 b-d	85.2	10.7	4.1	60
B 7592-1	23,856	19,264 b-e	80.7	12.9	6.4	67
B 8087-6	22,512	18,816 b-e	83.6	10.4	6.0	61
Atlantic-Starks	21,168	18,256 d-g	86.2	9.7	4.1	86
B 6969-2	20,496	16,688 d-f	81.4	12.3	6.3	60
LaChipper	17,808	14,000 ef	78.6	14.3	7.1	61
B 8019-4	16,912	13,888 ef	82.1	13.1	4.8	62
B 7802-2	16,016	12,992 f	81.1	13.3	5.6	65

1/ Sources of all clones and cultivars was the USDA Research Center in Beltsville, Maryland except for Atlantic-Starks which was supplied by Starks Farm of Rhinelander, Wisconsin.

2/ Specific gravity: 1.0 omitted.

3/ Specific gravity determined with a potato hydrometer.

4/ Mean separation by Duncan's multiple range test, 5% level.

NEBRASKA

R. B. O'Keefe and Eric D. Kerr

Variety Screening in Arizona

Promising new varieties and advanced selections were planted in commercial demonstration plantings in the Queen Creek (Ray Schnepf) and Glendale (J. A. Wood Co.) areas. Seven varieties and selections plus Kennebec were included in the chipping potato trial at Queen Creek. Two-hundred pounds of each variety were planted in 4-row blocks. Two 10-foot samples were harvested from each variety approximately 10 days before the final harvest date. ND8891-3 was superior to Kennebec in yield and specific gravity. Atlantic and Denali were comparable to Kennebec in yield of marketable potatoes free from defects and of higher specific gravity and chip quality. (Nebraska Table 1.)

Three Norgold strains and 3 advanced selections plus Centennial were included in the russet potato trial at Glendale. One hundred pounds of each were planted in single row plots. Ten foot samples of each were taken at harvest time.

Norgold 35 exceeded Norgold 10 and Norgold M in total and marketable yield and specific gravity. Neb. A63.71-1 was the highest yielding russet. A68678-1 exceeded Norgold 10, Centennial and Norgold M in total and marketable yield and had the highest specific gravity of all varieties (Nebraska Table 1).

A replicated demonstration of seven advanced selections and varieties plus the standard varieties Kennebec, Norgold and Red LaSoda was made at the Mesa Experiment Station with the cooperation of Dr. D. Pew. Neb. S1-3 was the highest yielding entry and is a chipping variety. Denali was comparable to Kennebec. Neb. A-143.70-2 (red) and Neb. 118 were comparable to Red LaSoda but Neb. 118 was of smaller size. Of the russet varieties, A68678-1 and Neb. A63.71-1 were comparable and superior to Norgold in total yield and overall market quality (Nebraska Table 2).

Twenty-three entries were included in a replicated 20-hill trial at the Mesa Experiment Station with the cooperation of Dr. Paul Bessey. Of the red varieties, Neb. 118 and Neb. A143-70-2 exceed Red LaSoda #10 in yield of marketable potatoes. The chipping varieties ND8891-3, Wisc. 738, Neb. S1-3, Dakchip, Norchip and Denali exceeded Kennebec in yield of marketable potatoes and chip color. However, Dakchip, Norchip and Denali were of smaller size. Atlantic, Superior L, and Oneida and Belchip were low yielding. Atlantic was higher yielding and of better quality than Belchip (Nebraska Table 3).

Of the russet entries, A68678-1, Neb. 498 and Neb. A63.71-1 greatly exceeded Norgold in yield and overall quality. Centennial and Belrus were low yielding.

Nebraska Table 1. Commercial potato trials in Arizona 1979.

Variety	Yield Cwt/A	Percentages				Tuber Wt. Oz.	Specific Gravity	PCII Color	* Defects
		US #1	Over 12 oz.	Under 2 in.	Culls				
		Chipping Varieties - Ray Schnepf							
ND 8891-3	377	88	2	10	0	6.2	1.083	3	
Kennebec	296	75	12	9	4	8.0	1.072	3	SG, OT
Atlantic	265	86	3	11	0	7.1	1.088	2	
Oneida	239	90	0	10	0	6.3	1.074	3	
Dakchip	225	67	2	29	2	4.6	1.077	3	BE
Denali	218	85	3	12	0	5.4	1.085	2	
Russet Varieties - J. A. Wood Co.									
Neb. A63.71-1	324	69	6	10	14	6.7	1.078	--	BE
Norgold 35	303	77	4	13	6	5.6	1.080	--	
A68678-1	289	64	18	7	11	7.5	1.087	--	GC, OT
Neb. 42-1	253	48	0	13	40	5.8	1.078	--	PE, DB
Norgold 10	238	64	15	14	8	6.7	1.078	--	OT
Centennial	232	56	13	23	8	6.4	1.085	--	GC
Norgold M	197	71	0	29	0	5.1	1.078	--	

* PCII on 1 to 10 scale.

1/ Queen Creek--Planted February 25; Harvest June 7 (102 days)
20 feet of row; 10" x 36" spacing.

2/ Glendale -- Planted February 12; Harvest June 10 (118 days)
10 feet of row; 10" x 34" spacing.

Nebraska Table 2. Potato variety demonstration plot in Arizona 1979.

Variety	Yield Cwt/A (2 $\frac{1}{4}$ -3-7/8)	Yield US #1	Percentages				Comments	
			Over 3-7/8	1-7/8	8-2-1/4	Under 1-7/8		
Neb. S1-3	254	154	16	15		3	4	W Heat Sprouts
Neb. A143.70-2	250	157	15	16		3	3	R SL. Overbrown
Red LaSoda	248	156	15	13		3	5	R SL. Overbrown, GC
Neb. 118	246	141	8	27		7	1	R SL. Overbrown
A68678-1	234	180	2	16		4	2	Rus Mature
Neb. A63.71-1	234	157	16	10		4	3	Rus Vigor, Mature
Kennebec	234	138	19	13		4	5	W Skins, GC, K
Denali	207	134	7	20		6	2	W Scab Vine
Neb. 42-1	207	134	4	21		8	3	Rus Skins, PE
Norgold	191	140	4	16		6	1	Rus SL. skinning

Planted: February 21. Harvested: June 12.

Four replicates of 2-rows 50 ft.

Mesa Experiment Station, Arizona.

Nebraska Table 3. Advance clone potato trial in Arizona 1979.

Selection	Color	Percentages						Tuber Wt. oz.	Specific Gravity	PCII Color 1/	Defects
		Yield Gwt/A	Yield US #1	Over 3-7/8	Under 1-7/8	Culls	Culls				
Neb. 118	R	297	224	17	6	1	7.1	1.077	--	--	
Red LaSoda	R	285	191	26	2	5	8.0	1.064	--	--	GC
ND 8891-3	W	283	205	18	7	3	6.7	1.073	2	SG	
Kennebec	W	277	174	13	5	19	8.5	1.071	3v	SG, GC	
Wisc. 738	W	266	176	22	3	9	6.1	1.063	3v	OT	
A68678-1	Rus	262	172	21	6	8	6.7	1.072	--	--	GC, K
Wisc. 726	W	262	164	27	2	8	7.5	1.065	2	SG	
Wisc. 729R	R	260	173	26	5	3	6.1	1.068	--	--	OB
Neb. 498	Rus	249	194	10	8	4	6.4	1.070	--	--	HS
Neb. A143.70-2	R	240	209	3	7	3	6.4	1.072	--	--	GC
Neb. SL-3	W	239	182	15	5	3	6.7	1.064	3	3	
Dakchip	W	224	202	4	5	2	6.1	1.063	2	SG	
Norchip	W	216	188	3	6	4	6.4	1.073	3v	3v	GC, K
Denali	W	216	185	6	5	2	8.0	1.080	2	2	
Atlantic	W	199	156	11	7	3	6.7	1.075	2	2	
Neb. A63.71-1	Rus	193	157	10	6	2	8.5	1.067	--	--	
Oneida	W	174	137	3	10	8	6.7	1.074	3	3	
Superior L	W	171	130	8	4	11	5.6	1.064	3	3	SG, HS
Norgold	Rus	159	129	0	11	8	6.7	1.062	--	--	
Neb. 74-1	Rus	149	115	9	7	6	6.7	1.067	--	--	
Belchip	W	145	112	11	4	6	6.4	1.070	2v	2v	
Centennial	Rus	103	82	0	11	9	5.6	1.062	--	--	PE, DB
Belrus	Rus	102	79	0	18	5	6.4	1.069	--	--	

1/ Chip color on PCII 1 to 10 scale.

Planted: February 9. Harvested: June 7 (118 days)

Four replicates of 20 hills; 10" x 34" spacing.
1000 lbs/A of 11-48-0; 2 lbs/A Actual Thimet.

Cooperative Trials in Colorado and Nebraska

As part of a cooperative variety development program, 27 advanced selections and varieties were included in replicated (2) 20-hill trials in Colorado and Nebraska. The most promising selections are: White chipping selections -- ND 8891-3, Wisc. 726, Wisc. 738, Neb. A129.69-1, WC672-2; Russets - A68678-1, Neb. A71.72-1; Reds - Wisc. 729R, Neb. A143.70-2 (Nebraska Tables 4 and 5).

North Central States Trials

Four standard varieties and 13 advanced selections were included in replicated (4) 20-hill trials in Nebraska and Colorado. The detailed data are reported elsewhere in this publication. Grade and quality data for the Nebraska trial are presented in Nebraska Table 6. The superior selections were Norland, Minn. 8777, Neb. A129.69-1 and Minn. 8224.

Early Blight Control

Results of studies of the effectiveness of the application of Bravo through center-pivot systems in 1978 were indicative of the potential control of early blight by this method. Consequently the studies were repeated and expanded in 1979 to include Bravo and Difolatan applied through the center-pivot system and by aerial sprays to Norchip and Norland fields.

By July 31 the disease had progressed into the upper leaves and almost all lower leaves were infected in control plots in the Norchip field. Fungicides had kept disease severity to roughly one-third that on non-treated plants. Plants treated through center-pivot sprinklers had disease severity as low or lower than those treated by air even though the severity was higher in sprinkler control plots. Although almost all leaves were infected by August 17 fungicides had delayed disease development to severe levels by two or three weeks. Early blight developed about one month later at the Norland test field but general progress of disease symptom expression, effect of fungicides and methods of applications were similar to the Norchip study (Nebraska Tables 7 and 8).

The differences in total yield, yield of US#1's, under 2 inch, sort-outs and specific gravity were significant for harvest dates for Norchip. Total and US#1 yields, percent US#1, specific gravity and tuber weight were significant for methods of application with center-pivot being superior to aerial application (Nebraska Table 9).

Bravo and Difolatan treatments were significantly better than the check plots in total and US#1 yield, specific gravity and tuber size. Bravo was significantly more effective than Difolatan when averaged over methods of application and dates, but equal to Difolatan for center-pivot application within harvest dates.

The Norland circle was later planted and early blight infection occurred later. There were no significant differences due to treatments when averaged over harvest dates. Total yield was significantly higher for the center-pivot method when averaged over treatments. Total yield for the Difolatan treatment was significantly higher than those of the Bravo and Check treatments when averaged over methods of application. However, Difolatan and Bravo were comparable in effectiveness for the center-pivot method of application (Nebraska Table 10).

Nebraska Table 4. Advanced selections and potato variety trial in Colorado 1979.

Variety	Color	Mat. 1/	Yield Cwt/A	Percentages			Sort Out	Specific Gravity	PCII Color 2/	Early Blight 3/	Defects 4/
				US #1	Over 4 in.	1-7/8					
WC 612-13	W	4	398	75	3	10	12	1.090	3	1	OT
WC 672-2	W	5	382	76	0	13	11	1.070	4	2	OT, Heat Sp
Wisc. 729	R	3	379	83	4	5	7	1.076	2	3	BE, OT, OB
Neb. 7.67-1	W	3	368	82	2	7	9	1.062	3	5	SG, OT
Neb. A71.72-1	Rus	3	366	65	0	18	17	1.073	3	3	PE
WC 521-12	W	4	361	84	0	6	9	1.083	2	1	BE
Neb. A129.69-1	W	4	357	90	2	5	2	1.073	4v	2	SG, PE
Denali	W	4	349	78	1	7	13	1.090	2	3	SG, GC
Wisc. 726	W	3	347	82	5	9	4	1.064	2	4	OT
Dakchip	W	2	346	84	2	11	2	1.076	1	4	BE
ND 8891-3	W	3	343	78	1	8	11	1.101	1	4	K, GC
Wisc. 738	W	4	338	82	5	7	6	1.084	3	2	BE, SG
AC 67560	R	4	336	86	1	11	9	1.081	4	3	OT, OB
Atlantic	W	3	335	89	0	10	0	1.084	2	3	SG
Neb. A143.70-2	R	3	335	77	0	9	14	1.070	5	3	BE, OT
Neb. A147.71-1	W	3	334	80	3	13	4	1.070	6	3	OT
A68678-1	Rus	5	330	66	5	4	14	1.081	2	2	PE, GC
Neb. 43.66-1	W	3	321	80	7	4	8	1.079	2	4	K, OT
Neb. A219.70-3	W	2	319	81	0	10	8	1.068	4v	3	BE
Wischip	W	1	317	79	2	16	2	1.077	2	5	OT, DAE
Neb. 210-2	Rus	2	316	94	0	3	4	1.072	5	4	GC, K
New Superior	W	3	309	75	0	11	14	1.077	3	2	DB, OT
Neb. A63.71-1	Rus	3	296	62	3	18	16	1.069	4	3	SG
Norgold	Rus	2	291	67	2	20	12	1.075	4	3	
Neb. 498	Rus	3	278	68	0	16	15	1.061	5	2	
Neb. 42-1	Rus	3	276	59	0	25	15	1.084	2	3	
Neb. 74-1	Rus	1	262	57	0	16	26	1.060	8	5	

1/ Maturity on Scale of 1 to 5; = 10% foliage or less; 3 = chlorotic and 50% foliage dead;

5 = 75% to 100% foliage green.

2/ PCII Chip Color 1 to 10; 1 to 4 acceptable.

3/ Early Blight foliage damage; 1 = 10% to 20%; 3 = 35% to 50%; 5 = 75% to 100%.

4/ BE = Bulged eye; SG = Sun Green; GC = Growth Crack; PE = Pointed ends; K = Knob; OB = Overbrown; OT = Off-type.

Nebraska Table 5. Advanced selections and potato variety trial in Nebraska 1979.

Variety	Color	Mat.	Cwt/A	Percentages						PCII Color 2/	Early Blight 3/	Defects 4/			
				US		Over 4 in.		Under 1-7/8							
				#1	1/	59	12	4	24						
Wisc. 729-R	R		456	59	12	4	24	1.085	6v	2	OS, OT, K				
Atlantic	W		423	61	5	8	26	1.088	3	4	Scab				
Neb. A143-70-2	R		399	52	6	6	36	1.077	4	2	OS				
Neb. A129.69-1	W		391	63	0	8	28	1.077	3.5	2	Scab				
ND 8891-3	W		384	54	10	8	29	1.080	4	3	Scab				
WC 672-2	W		379	57	0	13	29	1.085	3	2	PE, K				
Neb. A71.72-1	Rus		340	42	0	37	22	1.078	2	3	K, Scab, BE, SG				
Wisc. 726	W		340	51	8	9	32	1.072	3.5	3	Scab				
Neb. 7-67-1	W		308	57	0	7	36	1.068	5	5	OT				
AC 67560	R		304	47	0	12	41	1.069	6v	2	Scab, K, BE				
Neb. 43.66-1	W		298	68	0	19	13	1.072	3	2	GC				
Denali	W		295	42	5	15	37	1.091	3.5	3	Scab				
Neb. A63.71-1	Rus		295	47	0	15	37	1.074	4	4	PE, K				
Wisc. 738	W		290	62	0	9	29	1.087	3.5	3	Scab				
Neb. A219-70-3	W	Not determined	281	74	0	14	12	1.073	3	4	GC, SS, BE				
Neb. 498	Rus		275	44	0	16	40	1.072	5	3	GC, PE				
Dakchip	W		271	77	0	8	15	1.073	2	3	SG, Scab				
Neb. 42-1	Rus		266	46	0	12	42	1.072	5	3	GC, PE				
Neb. 74-1	Rus		265	36	0	22	42	1.068	5	5	K, GC				
WC 612-13	W		265	31	4	13	52	1.091	3.5	2	Scab, K, BE				
New Superior	W		263	58	9	10	23	1.073	2	3	DE, PE, OS				
A68678-1	Rus		249	32	17	26	26	1.085	3	2	SG, K, BE				
WC 521-12	W		247	65	3	11	21	1.098	3	3	GC, Scab, K				
Bellchip	W		213	31	2	15	52	1.081	2	3	K, Scab, BE				
Neb. 210-2	Rus		189	63	0	24	13	1.070	6v	4	OT				
Neb. A147.71-1	W		178	68	0	18	14	1.073	4	2	BE, Scab				
Wischip	W		169	76	0	20	4	1.073	2	4	Small				
Norgold	Rus		139	34	0	43	23	1.064	7	3	K, PE				

1/ Maturity on scale of 1 to 5; = 10% foliage or less; 3 = chlorotic and 50% foliage dead;

5 = 75% to 100% foliage green.

2/ PCII Chip Color 1 to 10; 1 to 4 acceptable.

3/ Early Blight foliage damage; 1 = 10% to 20%; 3 = 35% to 50%; 5 = 75% to 100%.

4/ BE = Bulged Eye; SG = Sun Green; GC = Growth Crack, PE = Pointed Ends; K = Knobs;

OB = Overbrown; OT = Off Type.

Nebraska Table 6. North Central States potato trial in Nebraska 1979.

Variety	Color	Mat.	Yield Cwt/A	Percentages				Specific Gravity	PCII Color	Early Blight	Defects
				US #1	Over 4 in.	Under 1-7/8	Sort Out				
Red Pontiac	R	4	376	51	16	3	30	1.065	5	2	Scab, K, BE
Rus. Burbank	Rus	4	328	12	0	10	78	1.078	4	2	PE, K, BE
Norland	R	1	324	77	3	8	12	1.059	4	5	Scab, BE, GC
Minn. 8777	R	4	319	57	3	10	29	1.073	7	2	GC, Scab, K
Neb. A129.69-1	W	4	309	80	2	10	8	1.082	4	2	SG, Scab, BE
Wisc. HS-17	R	2	290	36	0	29	34	1.062	3	4	Scab, BE
Norchip	W	3	289	65	2	6	26	1.080	3	4	GC, Scab, K
AK 38-2	W	5	273	50	4	12	35	1.089	3	2	PE, GE, Scab, K
Neb. S1-3	W	3	268	50	1	14	34	1.071	7	2	GC, SG, K
Wisc. 723	W	4	249	64	0	11	25	1.082	3	3	Scab, K, BE, SG
ND 146-4R	R	1	244	82	1	12	5	1.070	2	3	GC, S, BE
Minn. 9648	Rus	2	236	63	4	9	23	1.076	3	4	PE, GC
Minn. 8224	W	3	220	67	3	12	18	1.087	3	4	Scab, K, GC
Neb. A69.72.1	Rus	3	203	52	14	6	28	1.073	5	3	GC, K, BE
ND 137-2	Rus	2	201	40	0	44	16	1.068	6	5	GC, ST
La 42-38	R	5	189	64	7	16	12	1.075	4	3	Scab, K, GC
Wisc. 738	W	4	160	42	6	12	40	1.085	3	3	Scab, K, BE

1/ Maturity on Scale of 1 to 5; 1 = 10% foliage or less; 3 = chlorotic and 50% foliage dead;
 5 = 75% to 100% foliage green.

2/ PCII Chip Color 1 to 10; 1 to 4 acceptable.

3/ Early Blight foliage damage; 1 = 10% to 20%; 3 = 35% to 50%; 5 = 75% to 100%.

4/ BE = Bulged Eye; SG = Sun Green; GC = Growth Crack, PE = Pointed Ends; K = Knobs;
 OB = Overbrown; OT = Off-Type.

Nebraska Table 7. Early blight ratings for Norchip August 17, 1979.

	% leaflet infection		No. leafspots/leaf	
	Top	Bottom	Top	Bottom
<u>Center Pivot</u>				
Difolatan	93.8	100	32.2	-
Bravo	81.0	100	29.4	-
Control	99.6	100	123.7	-
<u>Aerial</u>				
Difolatan	95.4	100	40.3	-
Bravo	93.6	100	34.2	-
Control	99.8	100	116.6	-
(LSD .05)	(NS)			
<u>X</u> Center Pivot	91.4	100	61.8	-
<u>X</u> Aerial	96.2	100	63.7	-
(LSD .05)	(4.5)		(NS)	
<u>X</u> Difolatan	94.5	100	36.3	-
<u>X</u> Bravo	87.3	100	31.8	-
<u>X</u> Control	99.6	100	120.1	-
(LSD .05)	(5.5)		(11.8)	

Nebraska Table 8. Early blight ratings for Norland September 14, 1979.

	% leaflet infection		No. leafspots/leaf	
	Top	Bottom	Top	Bottom
<u>Center Pivot</u>				
Difolatan	13.8	100	1.5	-
Bravo	10.7	100	1.0	-
Control	93.7	100	17.2	-
<u>Aerial</u>				
Difolatan	20.0	100	2.4	-
Bravo	14.7	100	2.0	-
Control	71.3	100	9.1	-
(LSD .05)	(8.1)	(NS)	(2.1)	
<u>X</u> Center Pivot	39.4	100	6.5	-
<u>X</u> Aerial	35.3	100	4.5	-
(LSD .05)	(NS)	(NS)	(1.2)	
<u>X</u> Difolatan	16.9	100	1.9	-
<u>X</u> Bravo	12.7	100	1.5	-
<u>X</u> Control	82.5	100	13.1	-
(LSD .05)	(5.7)	(NS)	(1.5)	

Nebraska Table 9. Early blight control in Norchip 1979.

	Yield Cwt/A	Yield US#1	US#1	Percentages			Specific Gravity	Tuber Wt. (oz.)
				Over 4"	Under 2"	Sort Out		
<u>Center Pivot</u>								
Bravo	338	296	87	1	10	0.5	1.074	7.5
Difolatan	323	274	85	0	13	1.0	1.074	6.9
Check	241	215	89	0	9	1.0	1.068	5.5
<u>Aerial (Cut Seed)</u>								
Bravo	327	280	86	2	11	0.75	1.073	7.2
Difolatan	274	233	87	0	12	0	1.072	5.9
Check	246	213	87	0	13	0.25	1.067	5.0
<u>Aerial (Whole Seed)</u>								
Bravo	334	279	83	0	16	0	1.075	5.4
Difolatan	276	226	77	0	23	0	1.074	4.6
Check	203	159	77	0	23	0	1.070	3.6

Planted: 5/4/79

Harvested: 9/7/79

Nebraska Table 10. Early blight control in Norland 1979.

	Yield Cwt/A	Yield US#1	US#1	Percentages			Specific Gravity	Tuber Wt. (oz.)
				Over 4"	Under 2"	Sort Out		
<u>Center Pivot*</u>								
Bravo	250	183	73	0	22	4.5	1.072	5.7
Difolatan	305	219	70	0	25	5.0	1.070	6.1
Check	283	191	65	0	29	5.0	1.070	4.6

*No data for aerial application

Planted: 6/11/79

Harvested: 10/8/79 - Norland Variety

Processing Studies

Samples of four standard potato varieties and 15 selections were received from 10 locations in the North Central Region and two locations in Canada in 1978. The samples were evaluated as received (within one month of harvest) for sucrose and reducing sugar contents and chip color. Similar determinations were made after three, five and eight months of storage at 50° F. The average sucrose content (SR values) of the cultivars ranged from 1.56 to 3.72 mg/g compared with a range of 2.14 to 5.44 mg/g for 1977 samples. Chip color after one, three, five and eight months of storage was not correlated with SR values at harvest but was correlated in 1977. As in 1977, vine maturity and SR values were not correlated nor was SR correlated with number of days from planting to harvest. Glucose contents of tubers after storage were not correlated with SR values nor with vine maturity. Chip color after eight months storage was highly correlated with glucose contents of tubers ($r = 0.961$).

The average sucrose content (SR values) of tuber samples received from various locations ranged from 1.81 to 4.21 mg/g compared with a range of 1.42 to 4.27 mg/g in 1977. Chip color after one, three, five and eight months of storage of samples from various locations was not correlated with SR values but was highly correlated with glucose content after eight months of storage ($r = 0.914$).

Four varieties and seven selections were common to both years at eight locations. The ranking of cultivars or locations according to average sucrose content of potatoes in 1978 was not correlated with the rankings in 1977. Seasonal conditions (and culture) varied considerably among the locations and years which apparently affected variations in SR (sucrose) levels. The 1977 season was wet, and cool early in the season at most locations and normal at the other locations. The 1978 season was characterized by early wet and cold conditions in some locations but dry and warm to high temperatures in most areas. Floods and hail damaged crops in three locations. Weather and cultural data are being summarized and will be studied for specific effects on SR levels, reducing sugars and chip quality (Nebraska Tables 11 and 12).

The data suggest that the repeatability of genotypes over a wide range of environments was high for the two years while environmental variations within specific locations for the two years had a variable effect (interaction) on genotypes.

Nebraska Table 11. Chip color and sucrose content of potatoes in the NCS Trials in 1977 and 1978.

Selection	Sucrose (1)* %	Chip Color (1 to 10)						Vine Maturity ** 1977-1978	
		PCII (1)*		PCII (3)* Averages for 9 locations		PCII (5)* 1977-1978			
		1977-1978		1977-1978		1977-1978			
Red Pontiac	4.57	3.69	6.5	6.6	6.9	8.7	6.8	6.4	
Norland	3.45	1.56	5.6	4.7	6.0	8.3	6.1	8.6	
La. 92-157	3.32	0.28	5.5	5.2	5.1	8.0	5.4	7.7	
ND. 8850-2	3.17	2.74	4.2	3.2	4.2	3.8	4.7	4.7	
Rus Burbank	3.08	2.30	5.2	4.9	4.9	4.1	5.0	5.5	
Minn. 7973	2.96	2.97	5.2	4.2	4.5	6.4	4.9	7.8	
La. 0170	2.67	3.19	4.8	4.3	4.3	6.1	4.4	6.6	
Norchip	2.40	3.24	4.7	2.7	3.6	3.4	4.4	3.0	
Wisc. 738	2.35	2.02	5.0	4.5	4.2	6.1	4.9	5.2	
Wisc. 723	2.20	3.50	4.3	3.8	3.8	4.9	4.2	4.6	
Wisc. HS-17	2.14	3.20	5.2	4.3	3.6	4.7	4.3	4.7	

* Approx. number of months after harvest and storage at 50° F.

** Average vine maturity at harvest¹ = early, 5 = late.

Nebraska Table 12. Chip color and sugar contents of potatoes from various locations.

Location	Harvest Date	Sucrose (1)* mg/g	Chip Color (1 to 10)						Glucose (8) %	
			PCII (1)		PCII (3)1/ (5)		PCII (5)			
			1977 - 1978		1977-1978		1977-1978			
Manitoba	9/13	9/27	4.27	1.81	6.0	6.1	5.5	6.7	5.1	
So. Dakota	9/6	9/6	4.03	2.53	5.6	7.8	5.3	6.1	5.4	
Kansas	7/28	7/26	3.89	3.06	5.3	3.4	4.9	5.2	4.7	
Nebraska	9/22	9/22	2.09	2.76	3.6	2.8	3.8	4.0	3.8	
Ohio	10/3	10/13	2.08	4.21	4.0	3.2	4.3	7.3	4.2	
Wisconsin	9/20	9/27	2.01	2.35	4.4	5.3	5.6	8.1	8.3	
Alberta	9/21	8/28	1.42	3.00	-	5.1	3.3	7.4	3.7	
No. Dakota	9/12	-	1.35	2.74	-	7.6	3.8	7.9	5.4	
Mean			2.64	2.77	4.82	4.92	4.09	6.10	5.13	

* Numbers in parentheses - Approximate number of months after harvest.
1/ Treated with Fusarex.

New Jersey 1979

Melvin R. Henninger

Potato Variety Evaluation

In table 1 all experiments presented are replicated. Experiment No. 2 was conducted in South Jersey on a well-drained sandy loam. It was planted 3/30 and harvested 8/10. Experiment Nos. 4, 5, 7, and 8 were conducted near New Brunswick on a well-drained loam. They were planted 4/20 and harvested 8/22. Experiment No. 9 was mainly a russet trial conducted on a well-drained sandy loam. It was planted 3/31 and harvested 10/9. All plots were 24' long and 3' wide with 4 reps and seedpieces were planted 9" apart.

In table 2 all plots were single row, 12' long and 3' wide. This experiment was conducted in South Jersey on a well-drained sandy loam. It was planted 3/30 and harvested 8/10.

Commercial cultural practices were used on all experiments, irrigation supplemented natural rainfall. Specific gravities were determined by the air and water method.

Key to Rating System

Air Pollution: 1 = plants are dead; 2,3,4 = increasing plant appearance with varying degrees of defoliation; 5 = most leaves having speckling or bronzing, but general appearance is good; 6,7,8 = good plant conditions with decreasing foliar symptoms; 9 = none.

Tuber Color: 1 = purple, 2 = red, 3 = pink, 4 = dk. brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = bright white.

Tuber Texture: 1 = part rus., 2 = heavy rus., 3 = mod. rus., 4 = light rus., 5 = net, 6 = sl. net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Tuber Shape: 1 = round, 2 = most rd., 3 = rd. to oblong, 4 = most obl., 5 = obl., 6 = most obl., 7 = obl. to long, 8 = most long, 9 = long.

Tuber Depth*: 1 = very flat, 3 = flat, 5 = ok depth, 7 = good depth, 9 = excellent depth.

Tuber Conformation* and Overall Rating*: 1 = v. poor, 5 = fair, 7 = good, 9 = excellent.

Second Growth*, Growth Crack*, Hollow Heart*, Heat Necrosis*: 1 = very severe, 5 = moderate, 7 = slight, 9 = none.

* Seven or above is considered acceptable.

New Jersey Table 1. Data from five variety trials grown at three locations in New Jersey, 1979.

Air Pollution	Tuber Data										Yield over 1-7/8" cwt./A	Specific Gravity	Percent of Tubers over		Overall Rating		
	Color	Texture	Shape	Depth	Conf.	Sec. Gr.	Gr.	Cr.	H.	Heart			1-7/8"	.2-1/2"			
7	8	8	2	7	8	9	9	8	9		2	B6969-2	368	64	95	59	7
7	8	8	2	7	8	9	9	9	9		7	"	270	68	96	59	7
7	8	8	2	7	8	9	9	9	9		8	"	197	68	93	46	7
6	8	8	3	7	7	9	8				9	"	357		94	55	7
8	7	8	5	6	7	9	9	7	9		2	B6987-184	383	78	90	39	6
6	7	6	4	7	7	9	9	9	9		8	"	148	84	80	8	6
8	8	7	2	7	6	9	6	8	6		2	B7516-7	318	71	94	56	6
6	7	7	2	7	7	9	9	9	9		7	"	173	81	96	56	5
6	9	9	2	9	7	9	9	9	6		4	B7805-1	327	66	98	82	6
7	7	7	2	8	8	9	9	9	9		7	B8087-6	245	66	97	73	7
7	8	8	2	8	7	9	7	9	9		7	B8091-8	227	80	88	24	7
8	8	8	4	5	6	9	9	9	9		7	B8433-4	244	63	97	60	5
6	8	7	1	6	7	9	9	6	9		7	B8477-4	174	68	96	63	6
9	7	7	3	6	7	9	9	7	8		2	B8477-17	414	72	95	64	8
7	7	8	2	6	8	9	9	8	9		4	"	362	76	97	75	8
8	7	6	2	7	7	9	9	8	8		2	B8599-42	398	60	96	64	8
4	7	5	2	7	7	9	9	9	9		7	"	179	64	96	62	6
7	7	7	1	8	8	9	9	9	9		8	"	186	61	96	70	6
6	7	6	2	7	8	9	9	9	7		7	B8615-2	211	84	94	51	7
7	7	6	2	7	7	7	9	9	9		7	B8706-7	237	75	95	55	7
5	8	9	2	6	7	9	9	9	9		7	B8740-1	177	67	94	46	6
9	8	9	2	8	7	6	9	9	9		7	B8757-7	360	73	95	47	8
7	7	8	2	7	7	9	9	9	9		7	B8798-20	196	80	98	56	7
6	8	7	2	5	7	9	9	9	7		4	B8947-3	294	78	95	57	7
5	8	7	2	8	8	9	9	9	8		4	B9016-16	288	67	96	60	7
7	7	5	2	6	7	8	9	9	9		4	B9018-12	320	75	95	54	7
6	8	7	2	6	6	9	9	9	9		4	B9053-6	289	65	95	57	6
8	8	7	3	6	6	6	9	5	9		2	B9062-9	386	59	97	69	7
5	8	7	3	6	6	6	9	9	9		4	"	238	62	97	63	5
8	7	8	2	7	7	8	9	8	9		2	B9067-6	429	70	93	57	7
7	7	7	2	6	7	6	9	9	9		4	"	275	73	91	32	6
6	7	8	2	7	7	9	9	9	9		4	B9071-4	343	65	97	72	7
8	7	6	1	9	8	9	9	9	9		7	Atlantic	270	83	95	51	8
8	7	8	1	8	8	9	9	9	4		8	"	302	85	96	59	3
8	8	8	4	4	4	9	9	6	9		2	Belchip	410	64	97	75	7

New Jersey Table 1. (cont'd)

Air Pollution	Tuber Data							Exp. No.	Seedling	Yield over 1-7/8" cwt./A	Specific Gravity	Percent of Tubers over		Overall Rating
	Color	Texture	Shape	Depth	Conf.	Sec. Gr.	Gr. Cr.	H. Heart	Necrosis			1-7/8"	.2-1/2"	
7	8 8 2 3 4		9 9 7 9			7		Belchip		258	75	95	69	7
8	8 8 2 4 5		9 9 9 9			8		"		356	76	96	73	7
8	7 8 3 4 5		9 6			9		"		502		96	71	7
9	4 2 8 5 8		9 9 9 9			2		Belrus		303	76	84	19	8
7	4 2 8 3 8		9 9 9 9			7		"		214	77	86	21	8
9	4 2 8 5 7		9 9 9 9			8		"		234	77	93	21	7
8	6 5 8 6 5		8 9			9		Butte		417		92	21	5
7	7 8 2 6 7		9 9 9 9			5		C-11		299	85	97	71	7
5	7 8 2 6 7		9 9 9 9			8		"		211	84	97	64	7
5	5 3 7 5 6		8 9			9		Cent Rus		268		93	38	4
7	8 7 3 6 7		9 6 7 9			5		Denali		300	85	94	43	6
8	8 8 2 6 6		9 9 9 9			8		"		291	87	91	41	7
7	7 8 2 6 5		7 9 9 9			8		Houma		337	72	94	61	6
8	8 8 2 6 6		9 9 8 9			2		Hudson		516	68	98	81	6
8	8 8 2 7 5		9 9 9 9			8		"		346	74	98	81	7
6	7 6 4 5 7		9 7 9 9			5		Jemseq		249	70	97	50	6
8	7 8 3 6 7		9 9 5 9			2		Katahdin		432	63	95	59	7
7	8 8 2 6 7		9 9 8 9			4		"		315	66	96	64	7
6	8 8 3 5 7		9 9 7 9			5		"		256	60	93	51	7
6	8 8 3 5 6		9 9 9 9			7		"		210	64	96	53	7
8	8 8 2 6 7		9 7 9 9			8		"		325	61	96	64	7
7	5 3 5 6 6		9 7			9		Maine Rus		265		92	31	4
8	8 8 3 6 6		9 6 9 9			8		Michibone		304	68	97	71	7
8	8 8 2 6 7		9 9 9 9			8		Michimac		218	64	93	43	6
8	5 5 6 7 6		6 8			9		N Rus L		397		95	49	4
8	5 5 7 7 6		6 9			9		Nor Russet		411		95	52	5
9	8 8 2 5 5		9 9 7 8			2		Norchip		420	69	94	53	7
8	8 8 2 7 6		9 9 9 9			4		"		332	76	95	39	7
7	8 8 2 7 6		6 7 9 7			5		"		276	75	93	40	7
6	8 8 2 7 6		9 9 9 9			7		"		208	73	90	26	6

New Jersey Table 1. (cont'd)

Air Pollution	Tuber Data										Specific Gravity	Percent of Tubers over		Overall Rating		
	Color	Texture	Shape	Depth	Conf.	Sec. Gr.	Gr.	Cr.	H.	Heart		Exp. No.	Seedling	Yield over 1-7/8" cwt./A	1-7/8"	.2-1/2"
5	9 8 2 6 6		9 9 9 9			8	Norchip		171		73		90	19		6
7	7 8 2 6 7		7 9 9 9			8	Oneida		251		72		92	25		6
7	9 9 3 6 6		4 9 9 9			8	Ontario		290		63		89	34		5
8	7 5 9 6 3		1 7			9	R Burbank		457				95	47		1
7	2 8 4 5 5		6 9 9 9			8	Red Lasoda		333		58		94	57		6
6	7 7 7 5 7		9 9 9 9			5	Sup Late		262		66		96	48		5
8	7 7 4 7 7		9 9 8 9			2	Superior		350		67		95	59		7
6	7 7 4 7 7		9 9 9 9			4	"		251		70		99	70		7
7	7 6 4 7 7		9 9 9 9			5	"		344		69		98	49		7
6	7 6 4 7 7		9 9 9 9			7	"		131		70		93	34		6
6	7 7 4 6 7		9 9 9 9			8	"		191		69		95	38		6
8	7 7 2 7 7		9 9 9 9			8	Wauseon		231		68		96	61		7
7	7 8 3 5 7		7 9 9 9			5	AF186-5		352		74		93	30		7
6	8 8 4 7 7		9 9 9 9			5	AF205-9		265		75		87	19		7
8	8 8 4 6 7		9 9 9 9			5	AF238-21		366		71		96	53		8
5	5 7 3 7 5		6 7 9 9			5	AK06-5		217		76		88	24		2
5	8 9 3 7 6		7 9 9 9			5	AK24-3		205		61		94	38		2
7	7 8 4 7 7		9 7 9 9			5	AS201-4		223		65		94	43		6
7	8 7 1 8 8		9 8 9 9			5	AS201-10		274		69		90	30		7
8	8 8 2 6 7		9 9 9 9			5	BR7088-18		322		76		93	36		8
7	9 8 2 7 7		9 9 9 9			5	BR7093-23		338		67		94	47		7
7	8 8 5 7 8		9 9 6 8			5	CF73056-13		305		73		99	80		8
7	7 7 3 6 8		9 9 8 9			5	CF73058-14		330		70		96	66		8
7	6 7 7 3 6		9 9 9 9			5	F68036		312		60		93	47		5
8	1 8 6 7 5		7 9 9 9			5	F69026		312		70		96	54		6
8	5 4 8 7 5		9 4 9 9			8	W564-3A		265		63		87	17		3
8	5 4 8 7 5		7 6			9	W564-3A		529				96	50		5
7	8 8 3 4 7		8 9 9 9			5	W718		312		62		95	69		5
8	9 9 2 5 7		9 9 9 9			8	8YW-1		308		78		94	45		7
8	9 8 2 4 6		9 9 9 6			8	8YY-3		287		71		98	74		7

New Jersey Table 2. Observational trial grown in South Jersey, 1979.

Seedling	Total Yield CWT/A	Air Poll.	Rating						Seedling	Total Yield CWT/A	Air Poll.	Rating						Overall Rating			
			Color	Texture	Shape	Depth	Conformation	Hollow Heart				Color	Texture	Shape	Depth	Conformation	Hollow Heart				
B7802-2	528	9	9	8	3	6	4	9	9	6	B9062-5	208	7	8	8	4	7	6	9	9	6
B7802-2	298	8	9	9	3	2	7	9	9	6	B9071-1	486	9	8	8	3	4	7	5	9	6
B7805-1	438	9	8	8	1	8	8	9	5	1	B9071-1	313	8	9	8	2	7	8	7	9	8
B8087-6	510	8	8	8	1	6	7	9	9	8	B9071-4	614	9	8	8	1	8	6	9	9	6
B8091-8	418	8	8	9	2	6	7	9	9	6	B9096-9	446	9	8	7	2	7	7	9	9	7
B8433-4	538	7	7	7	4	6	6	9	9	6	B9097-5	346	9	7	6	4	7	5	9	9	5
B8477-4	463	9	8	8	2	7	5	5	7	5	B9099-5	414	8	7	6	2	7	7	9	9	7
B8498-9	278	9	8	8	1	5	7	5	9	3	B9119-12	501	9	8	7	2	6	7	9	9	7
B8498-9	227	8	7	7	1	7	7	9	9	6	B9119-12	404	9	8	8	2	7	7	9	9	8
B8503-13	536	8	8	8	2	5	7	9	9	7	B9127-1	458	8	8	8	4	7	6	7	9	7
B8524-10	432	9	5	3	9	7	2	7	5	1	B9127-6	442	9	7	7	4	7	7	9	9	6
B8524-12	538	7	5	3	8	8	7	9	9	6	B9127-17	542	9	7	8	4	7	6	9	9	7
B8524-17	259	7	5	3	8	6	5	9	9	3	B9130-24	632	9	7	7	1	7	8	6	9	7
B8615-2	456	9	7	7	2	7	6	7	9	6	B9130-34	323	9	7	6	3	6	6	7	6	3
B8618-5	488	8	9	8	6	8	7	7	9	7	B9136-7	459	8	8	8	5	6	7	9	7	7
B8618-5	407	8	8	7	5	7	7	9	9	7	B9137-9	284	9	5	3	8	5	7	9	9	6
B8706-7	426	8	7	5	5	6	6	5	9	5	B9138-3	486	9	7	7	3	6	6	9	9	6
B8724-2	537	7	7	5	2	7	5	6	9	5	B9138-29	427	9	7	6	7	6	7	9	9	7
B8724-2	474	7	7	5	2	5	6	9	9	3	B9139-1	534	9	8	8	7	5	5	6	5	1
B8740-1	322	7	8	8	1	6	8	8	9	8	B9139-24	273	7	8	8	6	6	5	9	9	3
B8757-7	589	9	7	7	3	7	6	7	9	7	B9140-2	349	7	7	6	3	6	7	9	9	7
B8798-20	402	8	8	6	1	8	8	9	9	8	B9140-4	386	7	7	7	1	8	8	9	9	7
B8812-15	140	8	8	8	3	5	6	9	9	1	B9140-6	357	7	8	8	1	8	7	9	9	7
B8812-15	134	9	8	8	2	7	7	9	9	2	B9140-11	372	8	8	7	3	7	7	9	9	7
B8832-3	205	9	7	7	1	7	7	9	9	5	B9140-14	408	7	8	6	1	8	8	7	9	7
B8832-3	193	9	7	7	1	7	7	9	9	5	B9140-17	398	7	7	8	3	6	7	6	9	7
B8907-4	290	9	7	6	1	8	7	9	9	5	B9142-11	513	9	7	7	3	6	5	3	9	3
B8947-3	145	9	8	8	2	7	7	8	9	5	B9144-5	512	9	7	6	3	8	7	9	6	5
B9004-8	431	9	1	8	2	8	7	9	9	7	B9146-1	366	9	8	8	2	7	5	7	9	5
B9016-16	280	7	8	8	1	7	8	9	9	6	B9152-11	368	7	8	7	6	7	7	9	9	6
B9016-20	477	9	7	6	2	7	6	9	9	7	B9155-12	356	7	8	8	1	8	8	9	9	8
B9016-20	350	9	7	6	2	7	6	9	9	4	B9155-12	352	9	8	7	1	7	7	9	9	5
B9018-12	339	7	8	8	3	7	7	9	9	5	B9165-3	259	8	8	7	1	7	7	9	9	3
B9020-10	708	9	8	7	2	7	6	9	9	7	B9175-7	213	9	7	7	6	7	6	9	9	3
B9020-10	324	9	8	8	3	6	7	9	9	7	B9192-1	259	8	8	7	2	1	5	9	9	3
B9020-18	351	7	4	2	7	5	6	7	7	4	B9224-6	505	8	7	8	2	7	6	9	9	7
B9028-6	264	8	5	4	8	7	4	7	9	3	B9228-2	170	9	8	8	7	7	6	9	9	3
B9028-23	375	9	5	3	8	6	5	9	9	3	B9230-6	339	8	5	4	8	7	7	9	9	7
B9053-6	331	9	8	8	4	6	7	9	9	6	B9258-2	243	7	7	5	1	6	7	9	9	3
B9062-5	344	8	8	8	4	7	5	7	9	3	B9285-2	229	7	8	8	2	7	6	3	9	3

New Jersey Table 2. (Cont'd)

NEW YORK (Long Island)
R.C. Cetas, B.A. Taborsky and R.S. Greider

Evaluation of Potato Cultivars and Breeding Lines for Scab Resistance on Long Island- 1979.

One hundred twenty five cultivars and breeding lines were evaluated for scab resistance at the Long Island Horticultural Research Laboratory, Riverhead, New York. 47 were in 10-hill, non-replicated plots and 78 were in 10-hill plots replicated twice. Seed sources included the NE-107 Regional Potato Improvement Project, Cornell University and USDA Potato Breeding Projects and Agway, Inc.

The Haven loam soil was naturally infested with Streptomyces scabies and has been maintained at a pH of 5.8 to about 6.5 with annual applications of 1000 lbs of lime per acre each spring. The 10-hill single row plots were hand-planted on April 20. Each test plot was paired with one of the Chippewa cultivar, which was planted by machine. The hand-planted seedpieces were spaced 12 inches apart in the row and the machine-planted ones about nine inches. All rows were 34 inches apart. 8-16-8 fertilizer at 2000 lb/A was applied as the seed furrows were opened with a two-row potato planter and Temik 15G at 33 lb/A was applied as the seed furrows were closed with a pair of tractor-mounted disc hillers. Weeds were controlled with normal cultivation and a broadcast application of Lasso (2 qt/A) and Lorox (3 lb/A) on May 4 and of Eptam 10G (50 lb/A) on June 1. Foliar sprays were applied as needed for disease and insect control. Approximately one inch of water was applied by overhead sprinkler irrigation on July 6 to supplement rainfall. The plants were rotocut on August 17 and tubers harvested on September 13.

Forty tubers, or all tubers if less than 40 were available, from each 10-hill plot were washed and examined for scab lesions. Each tuber was scored 0 (no lesions) to 4 (deep pits) for type of scab present and 0 (no scab) to 5 (61% or more) for surface area covered by scab lesions. These values were converted to individual tuber indices that ranged from 0 (no scab) to 140 (61% or more of surface area covered by deep pitted scab). The scab index for each plot was calculated by dividing the sum of the individual tuber indices by the number of tubers examined. The index for each cultivar and breeding line in the replicated trial was determined by calculating the average of the two plots. A scab index ratio was calculated for each cultivar and breeding line by dividing the cultivar or breeding line index by the index of their respectively paired Chippewa plots and multiplying the quotient by 100. The ratio allows one to determine quickly which cultivars or breeding lines were more or less resistant to scab than Chippewa and to compare one breeding line or cultivar with another.

Approximately six inches of rain fell during the months of May and June. The rainfall for this period was slightly below the 10-year average, which resulted in lower than normal soil moisture during and shortly after tuber-set for most cultivars and breeding lines. Environmental conditions were moderately favorable for scab during the early stages of tuber development; however, the severity of scab seemed to vary in different parts of the field. Under these conditions, the cultivars and breeding lines that appeared to be highly resistant (scab index ratio of less than 4.0) were Bison, Norchip, Norland, Russet Burbank, Superior, Wischip, AF92-3, CA02-7, S351-8, W564-3A, Q94-9 and Qi83-5.

Results of breeding lines and cultivars of potatoes grown in soils that were infested with Streptomyces scabies at Riverhead, New York in 1979

Cultivar or breeding line	Scab Index			Type of scab on affected tubers			Percentage of tubers with scab		
	Chipp-line	Chipp-ewa	ratio 1/	Majority of lesions	Average lesion	Chipp-line	Chipp-ewa	line	ewa
<u>10-hill, non-replicated, 40 tubers</u>									
Katahdin	0.5	1.8	27.8	2	2	1.8	2.0	15.0	45.0
S303-8	0.7	1.4	50.0	2	2	1.9	1.9	20.0	37.5
S303-13	0.1	0.5	20.0	2	2	2.0	1.7	2.5	17.5
S362-2	0.1	0.6	16.7	1-2	2	1.5	2.0	5.0	15.0
S365-5	0.1	1.8	5.6	1-2	2	1.5	2.0	5.0	52.5
S374-4	0.3	0.8	37.5	2	2	2.0	2.1	8.6	20.0
S367-29	0.3	4.2	7.1	2	2-3	2.0	2.3	7.5	57.5
S374-24	0.4	1.6	25.0	2	2-3	2.2	2.0	10.0	32.5
S374-30	2.6	6.4	40.6	2	2-3	2.0	2.9	55.0	77.5
Katahdin	1.0	2.7	37.0	2	2-3	2.0	2.2	27.5	47.5
S376-1	0.4	7.2	5.6	2	2-3	1.8	2.4	15.0	77.5
S376-2	0.8	6.4	12.5	2	2-3	1.9	2.2	20.0	82.5
S351-8	0.2	7.9	2.5	2	2-3	2.0	2.5	5.0	92.5
S377-2	3.6	9.8	36.7	2	2-3	1.9	2.3	67.5	92.5
S377-8	0.7	8.4	8.3	2	2-3	1.8	2.4	22.5	92.5
S377-9	2.5	11.4	21.9	2	2-3	1.9	2.4	52.5	97.5
S377-28	4.2	15.3	27.4	2	2-3	2.0	2.4	72.5	92.5
S377-38	1.1	8.0	13.8	2	2-3	1.7	2.5	27.5	82.5
Katahdin	6.4	10.1	63.4	2-3	2-3	2.1	2.4	70.0	85.0
S377-41	1.1	4.4	25.0	2	2-3	1.6	2.2	35.0	62.5
S377-59	1.4	12.5	11.2	1-2	2-3	1.7	2.4	40.0	87.5
S378-46	0.6	6.8	8.8	2	2-3	1.8	2.2	12.5	87.5
S423-25	3.4	11.4	29.8	2	2-3	2.2	2.2	47.5	97.5
S425-13	1.2	16.2	7.4	2	3	1.9	2.8	25.0	95.0
S425-21	3.6	9.6	37.5	2	2-3	2.0	2.4	75.0	80.0
S4472-6	14.0	10.6	132.1	2-3	2	2.4	2.1	100.0	85.0
S4472-10	7.0	9.9	70.7	2-3	2	2.2	2.1	80.0	92.5
S4473-4	1.2	9.0	13.3	2	2-3	1.9	2.3	30.0	95.0
B6986-2	3.2	10.4	30.8	2	2-3	2.3	2.4	65.0	90.0

(table continued next page)

breeding line	Scab Index	Type of scab on affected tubers				Percentage of tubers with scab			
		Majority of lesions		Average lesion		Chipp-line		Chipp-ewa	
	line	Chipp-ewa	ratio ¹	line	Chipp-line	line	Chipp-line	line	Chipp-ewa
B8491-1	3.2	11.2	28.6	2	2	2.2	2.2	80.0	92.5
B8491-2 ₄	8.6	7.8	110.2	2	2	2.1	2.3	97.5	100.0
B8689-6	10.4	13.2	78.8	2-3	2-3	2.4	2.4	87.5	92.5
B8690-12	11.2	13.8	8.7	2	2-3	2.3	2.6	15.0	97.5
B8710-11	4.4	11.4	38.6	2	2	2.0	2.2	75.0	97.5
B8710-16	4.0	17.2	23.2	2	3	2.0	2.7	72.5	97.5
B8711-2	4.3	7.7	55.8	2-3	2-3	2.2	2.2	75.0	85.0
B8779-1	3.0	7.6	39.5	2	2	2.0	2.3	57.5	82.5
B8877-1	2.2	6.6	33.3	2	2	1.9	2.1	47.5	97.5
B8880 ₄ -7	3.4	11.1	30.6	2	3	2.0	2.5	65.0	90.0
B8907-3	1.1	11.4	9.6	2	2-3	2.2	2.2	20.0	95.0
B8932-2	4.2	17.4	24.1	2	2	2.0	2.7	72.5	92.5
B8847-5	2.4	8.7	27.6	2	2	2.0	2.2	50.0	90.0
B8847-8	1.4	8.4	16.7	2	2	2.3	2.6	25.0	85.0
Katahdin	4.2	7.4	56.8	2	2	2.1	2.2	75.0	75.0
B8881-5	1.2	7.5	16.0	2	2-3	1.8	2.4	32.5	87.5
B8934-4	3.2	5.8	55.2	2-3	2-3	2.4	2.3	45.0	72.5
B8934-5	4.2	13.1	31.3	2-3	2-3	2.3	2.8	62.5	82.5
B8937-9	1.4	15.0	9.3	2-3	3	2.4	2.9	20.0	85.0
B8943-4	4.2	13.2	31.8	2	2-3	2.1	2.7	67.5	92.5
B8977-2	3.4	8.2	41.5	2	2	2.5	2.5	40.0	65.0

10-hill, 2 replications, 80 tubers

Alaska Red	3.2	11.8	27.1	2	2-3	2.0	2.6	81.2
Batoche	0.9	11.1	7.9	2	2-3	2.1	2.4	87.5
Belchip	3.9	13.4	29.1	2	2-3	2.1	2.6	55.0
Bel Rus	5.4	10.8	50.0	2	2-3	2.1	2.4	82.5
Bison	0.3	11.8	2.5	1-2	2-3	1.6	2.4	76.2
Butte	0.5	7.6	6.4	2	2-3	1.8	2.3	17.5
Campbell 11	15.6	13.3	117.3	2-3	2-3	2.5	2.4	66.2
Campbell 13	1.7	12.2	67.0	2	3	1.8	2.5	67.5
Centennial Russet	3.2	9.2	34.8	2	2-3	2.0	2.4	40.0
Croatan	2.7	11.8	22.9	2	2-3	2.0	2.4	65.0
Denali	4.1	10.4	39.4	2	2-3	2.0	2.6	46.2
Hudson	3.1	14.7	21.1	2	2-3	2.0	2.4	77.5
Jemseg	4.0	6.6	60.6	2	2	2.0	2.7	51.2
Katahdin	6.2	15.7	39.5	2	2-3	2.0	2.3	63.8
Kennebec	4.0	9.1	44.0	2	2-3	2.0	2.6	85.0
Maine Rus	3.0	18.2	16.5	2	2-3	2.0	2.2	72.5
Norchip	0.4	10.9	3.7	2	2	1.9	2.7	63.8

(table continued next page)

Cultivar or breeding line	Scab Index			Type of scab on affected tubers			Average lesion			Percentage of tubers with scab		
	Majority of lesions			Chippewa			Chippewa			Chippewa		
	line	Chippewa	ratio 1/	line	Chippewa	ewa	line	Chippewa	ewa	line	Chippewa	ewa
Norgold Russet	0.6	12.0	5.0	1-2	3		1.7	2.7		22.5	81.2	
Norland	0.2	10.8	1.8	2	2-3		2.0	2.5		6.2	92.5	
Russet Burbank	0.2	11.4	1.8	2	3		2.0	2.7		3.8	70.0	
Surchip	0.8	11.3	5.6	1-2	3		1.8	2.8		20.0	82.5	
Superior	0.3	9.7	3.1	1-2	3		1.7	2.6		12.5	73.8	
Wischip	0.2	8.8	2.3	2	2-3		1.8	2.2		8.8	77.5	
AF186-2	2.0	8.4	23.8	2	2		1.3	2.1		3.8	57.5	
AF92-3	0.1	4.4	2.3	1	2		1.9	2.3		42.5	80.0	
AF186-5	1.2	9.6	12.5	2	2-3		2.2	2.3		22.5	85.0	
AF205-9	3.4	9.3	36.6	2	2-3		2.1	2.5		56.2	85.0	
AF238-21	5.4	15.3	35.3	2-3	2-3		2.2	2.6		80.0	93.8	
B6969-2	2.3	14.5	15.9	2	2-3		2.0	2.6		40.0	72.5	
B6987-184	2.3	7.5	30.7	2	2-3		2.0	2.6		46.2	67.5	
B7583-6	3.8	20.6	18.4	2	3		1.9	2.8		86.2	88.8	
B7802-2	4.0	13.4	29.8	2	2-3		2.1	2.5		52.5	80.0	
B7845-29	0.9	8.3	10.8	2	2-3		2.0	2.4		20.0	73.8	
BR7093-23	4.7	12.8	36.7	2	2-3		2.1	2.7		68.8	78.8	
C72107-13A	7.6	7.2	105.6	2-3	2-3		2.1	2.1		82.5	85.0	
C7356-13A	2.2	10.6	20.8	2-3	2-3		2.2	2.6		31.2	83.8	
C7358-14A	2.4	7.2	33.3	2	2-3		1.9	2.3		56.2	77.5	
CA02-7	0.2	7.4	2.7	1-2	2		1.5	2.3		7.5	62.5	
CC26-1A	11.8	9.9	119.2	2-3	2		2.4	2.4		70.0	82.5	
CD23-1	1.3	16.2	8.0	2	2-3		1.5	2.5		26.2	93.8	
CD106-16	4.3	9.2	46.7	2	2-3		2.0	2.5		70.0	72.5	
CD138-1R	10.3	9.8	105.1	2-3	2-3		2.5	2.5		82.5	78.8	
F69106	5.3	14.5	36.6	2	2-3		2.0	2.5		35.0	77.5	
F69026	1.2	8.0	15.0	2	2		2.0	2.5		0.0	51.2	
W564-3A	0.0	9.1	0.0	-	2		-	2.1		58.8	86.2	
NY 59	3.4	15.4	22.1	2	3		2.2	2.8		75.0	85.0	
NY 61	6.9	16.6	41.6	2	2-3							

(table continued next page)

Cultivar or breeding line	Scab Index			Type of scab on affected tubers			Percentage of tubers with scab		
	Majority of lesions		Chippewa	Average lesion		Chippewa	line		Chippewa
	line	ratio 1/ Chippewa	line	Chippewa	line	Chippewa	line	Chippewa	line
Q53-5	1.6	11.6	13.8	2	2-3	1.7	2.5	62.5	77.5
Q54-6	13.0	13.2	100.0	3	2-3	2.8	2.7	85.0	85.0
Q54-11	4.1	14.2	28.9	2	3	1.9	2.7	73.8	86.2
Q54-15	9.9	10.1	95.2	2	2-3	2.6	2.6	55.0	56.2
Q54-26	3.4	14.2	23.9	2	3	2.0	2.7	67.5	87.5
Q94-9	0.0	10.8	0.0	-	2-3	-	2.3	0.0	92.5
Q94-18	3.8	12.5	30.4	2	3	1.9	2.6	73.8	78.8
Q94-25	1.3	5.1	24.1	1-2	2	1.8	2.3	30.0	50.0
Q155-3	4.0	12.2	32.8	2	2-3	1.9	2.6	75.0	83.8
Q183-5	0.2	12.1	1.6	2	2-3	1.7	2.4	8.8	68.8
Q461-8	5.2	8.2	63.4	2	2-3	2.0	2.5	85.0	83.8
4Q61-12	1.5	14.1	10.6	2	2-3	1.8	2.6	41.2	83.8
4Q74-12	5.4	16.6	32.1	2	2-3	2.0	2.9	65.0	81.2
R471-8	4.2	13.3	31.6	2	2-3	2.0	2.4	56.2	91.2
R471-62	7.5	14.6	51.4	2-3	2-3	2.8	2.1	62.5	95.0
R471-89	2.8	6.6	41.2	2	2-3	2.0	2.4	45.0	77.5
CC05-17	0.7	12.6	5.6	1-2	2-3	1.3	2.5	37.5	81.2
CC06-5	0.9	16.1	5.5	2	2-3	1.8	2.6	25.0	90.0
CS7397-1	1.8	4.0	45.0	2	2-3	2.0	2.4	32.5	48.8
CS7218-11	0.6	5.1	11.8	1-2	2-3	1.6	2.2	13.8	58.8
CS7232-7	3.4	8.6	39.5	2	2	1.9	2.4	58.8	81.2
CS7355-8R	5.0	9.0	55.6	2	2-3	1.9	2.4	67.5	77.5
CS7355-13	9.1	8.3	103.4	3	3	2.4	2.5	81.2	78.8
CS7355-17R	27.1	10.1	260.6	3	2-3	2.8	2.5	85.0	81.2
CS7395-9	4.1	10.1	39.4	2	2	2.1	2.1	62.5	91.2
CS73100-4	0.8	5.1	15.7	2	2	1.8	2.2	16.2	60.0
FL 18	0.2	15.5	1.3	1	3	1.1	2.9	10.0	88.8
FL 1115	0.0	7.9	0.0	-	2	-	2.3	0.0	53.8
FL 1234	0.6	9.8	6.1	1-2	2	1.7	2.3	17.5	75.0
FL 1244	1.2	6.5	17.4	2	2-3	1.8	2.1	31.2	66.2
FL 1252	0.2	10.3	1.9	2	2-3	2.0	2.2	3.8	86.2

1/ Ratio= index for cultivar or line divided by index for paired Chippewa, multiplied by 100

2/ Values are for one replication only- 40 tubers

NEW YORK STATE (LONG ISLAND)

R.S. Greider, J.B. Sieckza, and J.F. Creighton

Long Island Potato Variety Trials, 1979

Background. Seven potato variety trials and a spacing-fertility experiment involving five varieties were conducted at the Long Island Horticultural Research Laboratory at Riverhead, New York. All trials were conducted on a Haven loam soil. Pre-cut seed was planted on April 11 and 13, 1979. One ton of 8-16-8 fertilizer and aldicarb were applied at planting. Herbicides alachlor and linuron were applied at drag-off and EPTC was put on at layby.

The plot area was irrigated three times during the season. Fungicide and insecticide sprays were applied at weekly intervals beginning in early June. Plots were vine killed on Aug. 15 (reds and early round whites) and Sept. 4 (all others). The early trials were harvested on August 28 and the later ones during the week of October 8. Tubers were graded within a week after harvest.

Treatments were replicated four times except in a few cases where there was only enough seed for three reps. Plots were 20 feet long by two rows wide (four rows for spacing/fertility trials). Rows were 34 inches apart and spacing within the row was nine inches except where spacing was a variable.

NE107 Early Variety Trial: (Table 1). There were 11 early- to mid-season round white lines entered in this trial. Three of the entries, Campbell 11, AF186-5 and CF7358-14, have resistance to golden nematode. Yields were generally good with all lines going above 350 cwt.

Campbell 11, Jemseg, AF186-5, B7802-2, CF26-1 and CF7358-14 had high appearance scores. Denali, AF238-21, CF26-1, B6969-2 and Campbell 11 showed problems with skinning during harvest and grading. Poor conformation or deep eyes was a problem with Denali, Croatan, AF238-21, and Superior. Jemseg sizes early and produces attractive round tubers. Line B7802-2 produces blocky, oblong tubers with an attractive white skin. Lines to be retested include B7802-2, AF186-5, CF7358-14, Campbell 11 and Jemseg.

NE107 Late Variety Trial: (Table 2). Thirteen late-maturing round white selections were tested in this trial. Hudson, AF205-9, CA02-7, AF186-2 and B6987-184 are resistant to golden nematode. Hudson, AF92-3, Katahdin, Kennebec and AF205-9 gave outstanding yields of 440 cwt. or higher. Katahdin, AF205-9, CA02-7 and CF72107-3 had very high appearance scores. Internal necrosis was a problem with CF72107-3. Hollowheart was somewhat of a problem with B6987-184. Promising lines which are worthy of retesting include AF205-9, CA02-7 and the standard Katahdin.

Russet Variety Trial: (Table 3). Seven long, russet type potatoes were tested in this trial. Line CD138-4R was the only entry to produce a good yield. Others were moderate to low. Belrus at 227 cwt. was particularly disappointing. From the standpoint of tuber conformation and specific gravity only Belrus was acceptable. Hollowheart was a problem with Centennial Russet, Mainrus and B7583-6. Centennial Russet, Norgold L and CD138-4R had S.G. similar to or lower than a typical Katahdin. Only 60% of the tubers of Russet Burbank were of U.S. No. 1 quality. Further consideration will be given to Belrus. The low yield potential will require that growers receive a premium at the marketplace.

Red Variety Trial: (Table 4). Six round, red lines were tested in 1979. Line B7744-5, Batoche and Chieftain produced yeilds over 500 cwt/acre. Line B7744-5 did not have a desirable deep, red color but was more a dull pink color. Chieftain was later in maturity and skinned excessively when harvested in late August. Alaska Red, Bison and Norland had high appearance scores, deep red color and good skin quality, although yields were all below 400 cwt. Bison had a high incidence of growth cracking. Batoche, Bison and B7744-5 showed a potential hollowheart problem. Promising lines are Alaska Red and Norland for early harvest and Chieftain for later harvest.

Long Island Early Round White Trial: (Table 5). Fifteen early- to medium-maturing selections from Campbell Soup Co., USDA and Cornell were evaluated in this trial. Only the standards, Onaway and Chippewa, are susceptible to golden nematode.

Yields were generally very good with most lines producing over 400 cwt. marketable potatoes per acre. Only AS201-10, B8932-2 and Q94-25 yielded less than 400 cwt. Lines yielding over 450 cwt. include: Onaway, B8884-7, B8907-3, CS73132-2, 4Q61-12 and 4Q74-12. Lines with appearance scores over 8 include: B7200-33, B8710-16, CS73132-2, B8907-3, AS201-10, Campbell 11, B8711-2 and B8932-2.

Onaway, Chippewa and 4Q61-12 are unacceptable due to poor appearance scores. Line CS73132-2 had 12 of 40 large tubers with brown center. Lines AS201-10, B7200-33 and B8932-2 had 9 or 10% under 2-inch size. Internal necrosis was a problem with B8711-2.

Lines which are worthy of continued testing include: 4Q74-12, B8884-7, B8907-3, B8710-16, B8710-11, Campbell 11 and B7200-33.

Long Island Mid-Season Round White Trial: (Table 6). Fifteen selections from USDA, Campbell Soup Co., Cornell and Penn State were evaluated in this trial. All lines are resistant to golden nematode except Katahdin, Chippewa and 8YW-1.

Very high yielding lines included 4Q61-8, Q53-5, Q54-11, B7592-1 and 8YW-1. Lines with overall rating scores equal to or higher than Katahdin were B8491-24, B8779-1, NY61 and NY65. Katahdin, B8491-24, B8689-6, and Q54-11 produced over 95% marketable tubers. Line 8YW-1 produced excellent potato chips.

Internal necrosis was a problem with B7805-1, CS7212-4, 4Q61-8 and R471-89. Lines B7805-1, NY61, Q53-5 and R471-89 had excessive hollowheart. Lines CS7212-4 and NY61 produced small tubers with 10% under 2 in. Line B8779-1 was very low yielding. Skinning was a serious problem with 4Q61-8, Q54-11, Q53-5, NY65, NY61, B8491-24 and B7592-1. Lines B8779-1, NY65, Q53-5 and 8YW-1 had prominent or infected lenticels.

Of this group only B8491-24 will be retested in 1980. Even this line is marginal.

Long Island Late Round White Trial: (Table 7): Fifteen selections from Campbell Soup Co., USDA, Cornell and Penn State were evaluated in this trial. All lines are resistant to golden nematode except Katahdin, 8NW-8, 8YY-1 and 8YY-3.

Exceptionally high yielding lines include NY63, 8YY-1, 8YY-3, AS201-4 and B6986-2. Lines with greater than 95% marketable yield include NY63, NY66 and 8YY-3. Lines B8690-12, NY64, NY66 and R471-62 had good skin characteristics. Lines B6986-2, 8YY-1 and 8YY-3 had good potato chip color scores.

Hollowheart was a problem with B6986-2, B8690-12, 8YY-1 and 8YY-3. Tubers of line B8877-1 were too small. Enlarged or prominent lenticels was a problem with AS201-4, B6986-2, B8491-1, NY63, NY66, R471-8, 8NW-8, 8YY-1 and 8YY-3. Skinning or feathering was excessive with many of these late varieties including: Katahdin, B8491-1, CS73107-8, NY63, 8YY-1 and 8YY-3. Line NY64 had a high incidence of Potato Spindle Tuber Viroid (PSTV). Poor appearance scores and growth cracks resulted from this infection.

High yielding and attractive lines which will be retested in 1980 include NY63, NY66, NY64, R471-62 and CS73107-8. Cornell line R471-62 is felt to be the most promising selection tested in 1979.

Variety, Spacing, Fertility Trials: (Table 8).

Belrus. Marketable yield for a composite of all six treatments was a disappointing 276 cwt. There was no significant difference in yield among the treatments. At each spacing, yields were slightly depressed with the higher fertility rate. Closer spacing resulted in more small potatoes (not significant) and wider spacing caused more hollowheart to be present. Best results were attained by using a 9 inch spacing.

Campbell 11. The combination of nine inch spacing and 160 lbs. of nitrogen resulted in the highest yield. The same fertilizer rate with 7 and 11 inch spacings produced statistically equal yields, but the high fertility rate yielded significantly less. There was a slight tendency for more under 2 in. potatoes at 7 in. spacing. Chef's (greater than 3.5 in.) increased with wider spacings. Culls and hollowheart were not affected by treatments. Percent marketable yield was highest at the 9 in. spacing (97%).

NY61. With NY61 there is a direct relationship between spacing and yield. Highest yields were attained with a 7 in. spacing and yields reduced as spacing increased. This seems rather unusual since NY61 generally has a large set and the tubers tend to be small. Wider spacings did not cause tubers to fill out more. Fertility levels had no effect upon yield of U.S. No. 1 potatoes. Chef's and under 2 in. size were not greatly affected by spacing and fertility treatments.

B6987-184. There were no significant differences in yield or sizes among the six treatments. There was a tendency for higher yields from the lower fertility rate.

B7583-6. Closer spacing and higher fertility rates resulted in higher yields. The highest yielding treatment was 7 in. spacing and 160 lbs. nitrogen. Size distribution was not significantly affected by the treatments. Hollowheart became a severe problem with the 9 and 11 inch spacings. Line B7583-6 should be spaced closer than 9 inches.

TABLE 1. NE 107 EARLY VARIETY TRIAL, 1979.

LINE	YIELD (CWT./A)		% OF TOTAL YIELD				3/			3/			4/			CHIP COLOR 11/9
	TOTAL	U.S.	U.S. No. 1	OVER 4"	UNDER 2"	CULLS	HOLLOW HEART	BROWN CENTER	NECROSIS	INTERNAL	SPECIFIC GRAVITY	OVERALL RATING	VINE MATURETY	11/9	11/9	11/9
DENALI	524	466	a ^{1/}	89	5	7	4	5/40	0/40	0/40	1.080	7.0	L	7.5		
B7802-2	477	435	ab	91	3	4	5	2/40	0/40	0/40	1.063	7.5	ME	6.5		
AF186-5*	469	433	abc	92	3	6	1	2/40	0/40	0/40	1.071	8.0	ML	6.0		
CROATAN	483	433	abc	90	3	7	3	5/40	2/40	4/40	1.056	4.5	ME	7.0		
AF238-21	475	426	abc	90	9	5	5	3/40	0/40	2/40	1.060	6.5	ME	8.5		
CF26-1	465	421	abc	90	6	6	3	0/40	0/40	1/40	1.071	8.2	ME	6.5		
CF7358-14*	422	391	bcd	93	7	6	1	0/40	0/40	0/40	1.061	8.0	E	7.5		
B6969-2	411	385	bcd	94	4	5	1	2/40	0/40	0/40	1.058	7.5	E	7.5		
SUPERIOR	426	384	cd	90	0	7	3	0/40	1/40	3/40	1.065	6.0	E	7.0		
CAMPBELL 11*	387	362	d	93	4	4	2	3/40	0/40	0/40	1.072	8.2	M	6.0		
JEMSEG	394	355	d	90	7	4	6	1/40	2/40	1/40	1.065	8.7	VE	7.5		

* Denotes lines with golden nematode resistance.

^{1/} Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.^{2/} Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.^{3/} Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.^{4/} Based on 1-10 scale, 10 being perfect.^{5/} VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 2. NE 107 LATE VARIETY TRIAL, 1979.

LINE	YIELD (GWT./A)				% OF TOTAL YIELD				4/				CHIP COLOR 11/9	
	TOTAL	U.S.	No. 1	U.S. No. 1	OVER 4"	UNDER 2"	CULLS 2/	HOLLOW HEART	BROWN CENTER	INTERNAL NECROSIS	SPECIFIC GRAVITY	OVERALL RATING	VINE 5/ Maturity	
HUDSON*	548	510	a1/	93	11	3	4	0/40	0/40	1/40	1.064	6.7	ML	9.0
AF93-3	528	494	ab	94	10	4	2	0/40	0/40	0/40	1.058	6.7	ME	9.0
KATAHDIN	519	493	ab	95	5	0	0/40	0/40	0/40	1.060	8.5	ML	--	
KENNEBEC	549	478	abc	87	8	7	5	0/40	0/40	1/40	1.064	5.7	L	8.0
AF205-9*	486	444	bcd	91	5	7	2	0/40	0/40	1/40	1.074	8.0	ME	6.0
CF7356-13	474	430	cde	91	21	3	6	2/40	0/40	1/40	1.071	7.5	ML	8.0
CA02-7*	450	415	def	92	4	7	1	1/40	0/40	1/40	1.064	7.7	L	8.0
CF72107-3	447	410	def	92	8	5	3	1/40	0/40	9/40	1.063	5.5	M	7.5
BR7088-18	417	392	defg	94	3	4	2	1/40	0/40	1/40	1.072	6.7	M	6.5
F69016	441	378	efg	86	7	5	9	2/40	0/40	0/40	1.066	5.7	ML	7.0
CD106-16	426	362	fg	85	14	5	10	0/40	0/40	1/40	1.070	6.2	L	7.0
AF186-2*	380	349	g	92	1	7	1	2/40	0/40	0/40	1.076	6.5	E	6.5
B6987-184*	325	292	h	90	2	7	2	5/40	0/40	1/40	1.082	6.5	ML	6.5

* Denotes lines with golden nematode resistance.

1/ Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

2/ Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

3/ Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

5/ VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 3. LONG ISLAND RUSSET VARIETY TRIAL, 1979.

LINE	TOTAL	YIELD (CWT./A)			% OF TOTAL YIELD			HOLLOW HEART	BROWN CENTER	INTERNAL NECROSIS	SPECIFIC GRAVITY	OVERALL RATING	VINE 5/ Maturity	CHIP COLOR 11/9	
		U.S. No. 1	U.S. No. 1	UNDER 4 oz.	4-10 oz.	10-16 oz.	OVER 16 oz.								
		CD138-4R	458	357 a ^{1/}	78	10	42	27	9	1/40	0/40	1/40	1.060	7.0	M
RUSSET															
BURBANK	509	305 ab	60	16	49	9	1	1/40	0/40	0/40	0/40	1/074	5.0	VL	7.5
MAINE RUS	354	293 abc	83	14	61	18	3	16/40	0/40	0/40	0/40	1.064	6.2	VE	6.5
NORGOLD L	425	274 bc	64	27	54	9	1	2/40	0/40	0/40	0/40	1.056	5.7	L	10.0
B7583-6	343	263 bc	77	19	54	19	3	10/40	0/40	0/40	0/40	1.070	7.2	L	7.0
CENTENNIAL															
RUSSET	320	242 bc	76	23	59	12	4	12/40	1/40	0/40	0/40	1.063	8.5	E	9.0
BELRUS	314	227 c	72	25	63	9	0	1/40	0/40	0/40	0/40	1.070	8.7	E	7.5

* Denotes lines with golden nematode resistance.

^{1/} Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

^{2/} Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

^{3/} Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

^{4/} Based on 1-10 scale, 10 being perfect.

^{5/} VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 4. LONG ISLAND RED VARIETY TRIAL, 1979.

LINE	YIELD (CWT./A)		% OF TOTAL YIELD		3/ HEART	SPECIFIC GRAVITY	4/ RATING	APPEARANCE	VINE Maturity	5/ WASHING	% SKIN INTACT
	TOTAL	U.S. No. 1	U.S. No. 1	3.5"							
B7744-5	566	545 a ^{1/}	96	8	3	1	7/32	1.059	6.2	E	90
BATOCHÉ	561	531 a	95	12	4	1	10/39	1.060	7.5	ME	90
CHIEFTAIN	570	516 a	91	3	7	2	1/19	1.055	7.2	ME	85
BISON	446	384 b	86	10	5	4	11/19	1.057	8.7	VE	95
ALASKA RED	414	378 b	91	2	7	2	0/10	1.065	8.0	M	95
NORLAND	409	366 b	89	2	5	6	1/7	1.057	8.0	VE	90

* Denotes lines with golden nematode resistance.

^{1/} Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

^{2/} Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

^{3/} Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center, and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

^{4/} Based on 1-10 scale, 10 being perfect.

^{5/} VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 5. LONG ISLAND EARLY ROUND WHITE VARIETY TRIAL, 1979.

LINE	YIELD (CWT./A)		% OF TOTAL YIELD				3/			3/			4/			CHIP COLOR 11/9
	TOTAL	U.S. No.1	U.S. No.1 3.5"	OVER 2"	UNDER 2"	CULLS	HOLLOW HEART	BROWN CENTER	NECROSIS	INTERNAL	SPECIFIC GRAVITY	OVERALL RATING	VINE MATURED MATERIAL			
4Q61-12*	556	507	a ^{1/}	91	21	6	3	0/40	0/40	0/40	1.064	5.7	M	8.0		
CS73132-2*	521	489	ab	94	13	4	2	0/40	12/40	3/40	1.065	8.7	E	7.0		
4Q74-12*	513	488	ab	95	33	3	2	0/40	0/40	0/40	1.057	7.2	E	6.5		
ONAWAY	548	488	ab	89	37	4	7	0/40	0/40	0/40	1.059	5.0	ME	10.0		
B8884-7*	503	480	abc	95	8	3	2	3/40	0/40	0/40	1.070	7.7	ME	8.0		
B8907-3*	509	478	abc	94	25	5	1	1/40	0/40	3/40	1.063	8.5	M	7.5		
B8711-2*	496	445	bcd	90	8	7	3	0/40	0/40	5/40	1.064	8.2	VE	8.0		
B8710-16*	474	437	cd	92	15	5	3	4/30	0/30	1/30	1.064	9.0	VE	8.5		
CHIPPEWA	469	427	d	91	16	7	2	2/40	1/40	2/40	1.061	5.7	M	7.5		
B8710-11*	448	412	d	92	11	6	2	0/40	0/40	1/40	1.069	7.7	E	8.0		
CAMPBELL 11*	436	410	d	94	22	4	2	3/40	0/40	0/40	1.071	8.2	M	7.0		
B7200-33*	465	410	d	88	2	9	3	2/40	5/40	0/40	1.054	9.0	VE	10.0		
B8932-2*	408	366	e	90	5	9	1	0/30	0/30	0/30	1.063	8.3	VE	9.0		
AS201-10*	412	364	e	88	7	10	2	2/40	0/40	0/40	1.061	8.5	E	7.5		
Q94-25*	386	363	e	94	31	4	2	1/40	0/40	0/40	1.066	7.7	E	7.0		

* Denotes lines with golden nematode resistance.

1/ Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

2/ Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

3/ Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center, and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

4/ Based on 1-10 scale, 10 being perfect.

5/ VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 6. LONG ISLAND MID-SEASON ROUND WHITE VARIETY TRIAL, 1979.

LINE	YIELD (CWT./A)		% OF TOTAL YIELD		3/		3/		4/		CHIP COLOR 11/9				
	TOTAL	U.S.	U.S. NO.1	OVER 4"	UNDER 2"	CULLS		HOLLOW HEART	BROWN CENTER	NECROSIS	GRAVITY				
						2/	2/								
4Q61-8*	613	576	a ₁ /	-	94	10	3	3	0/40	0/40	3/40	1.057	6.5	ML	6.5
Q53-5*	590	543	ab	92	9	3	5	5	5/40	0/40	1/40	1.069	6.0	L	7.5
Q54-11*	559	530	ab	95	4	3	2	2	1/40	0/40	0/40	1.060	7.0	M	8.0
B7592-1*	537	501	bc	93	7	5	2	0/40	1/40	0/40	1/40	1.063	7.0	L	7.0
8YW-1	525	488	bcd	93	0	6	1	2/40	3/40	0/40	0/40	1.071	7.2	L	5.5
B8491-24*	496	470	cde	95	8	4	1	0/40	0/40	0/40	0/40	1.064	7.7	ML	8.5
NY61*	510	456	cde	89	0	10	1	1	7/40	2/40	1/40	1.062	7.7	ML	6.5
KATAHDIN	462	443	cdef	96	4	4	0	2/40	1/40	0/40	0/40	1.057	7.5	ML	7.0
NY65*	472	440	def	93	2	6	1	4/40	1/40	0/40	0/40	1.070	7.5	M	6.5
CS7212-4*	499	434	def	87	1	10	3	0/40	0/40	3/40	1/055	7.2	ME	8.5	
B7805-1*	460	415	ef	90	12	4	6	10/30	0/30	6/30	1.057	7.0	ML	9.5	
B8689-6*	426	408	ef	96	5	3	1	1/40	0/40	1/40	1.060	6.2	ML	8.0	
R471-89*	423	384	fg	91	13	2	7	6/40	0/40	8/40	1.065	5.7	ME	6.0	
CHIPPEWA	429	382	fg	89	4	6	5	2/30	0/30	1/30	1.055	6.0	L	--	
B8779-1*	368	337	g	92	3	6	2	0/40	0/40	1/40	1.060	7.7	ML	6.0	

* Denotes lines with golden nematode resistance.

1/ Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

2/ Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

3/ Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center, and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

4/ Based on 1-10 scale, 10 being perfect.
5/ VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

TABLE 7. LONG ISLAND LATE ROUND WHITE VARIETY TRIAL, 1979.

LINE	YIELD (CWT./A)			% OF TOTAL YIELD			3/			3/			4/			CHIP COLOR 11/9
	TOTAL	U.S.	No. 1	U.S.	OVER	UNDER	CULLS	HOLLOW HEART	BROWN CENTER	INTERNAL NECROSIS	SPECIFIC GRAVITY	OVERALL RATING	VINE Maturity	5/ Maturity		
				No. 1	4"	2"										
NY63*	579	551	a ^{1/}	95	18	3	2	1/40	0/40	1/40	1.057	7.5	ML	10.0		
8YY-1	549	508	ab	92	10	3	4	5/40	0/40	2/40	1.069	6.7	L	6.0		
8YY-3	526	505	ab	96	10	3	1	8/40	0/40	0/40	1.067	7.0	L	6.0		
AS201-4*	528	492	abc	93	10	3	4	0/40	0/40	2/40	1.060	7.0	ML	8.5		
B6986-2*	533	491	abc	92	15	4	4	11/40	1/40	0/40	1.061	5.7	ML	6.0		
NY66*	493	473	bc	96	12	3	1	0/40	0/40	0/40	1.065	7.2	ML	7.5		
NY64*	531	468	bc	88	6	5	7	0/40	0/40	3/40	1.061	6.2	M	9.5		
R471-62*	500	465	bcd	93	7	6	1	0/40	0/40	2/40	1.058	8.0	L	8.0		
CS73107-8*	502	459	bcd	91	1	7	1	1/40	2/40	0/40	1.063	8.0	M	7.0		
B8877-1*	528	456	bcd	86	1	9	5	0/40	0/40	1/40	1.055	4.7	L	10.0		
8NW-8	472	427	cde	90	0	8	2	0/40	1/40	3/40	1.071	5.5	L	6.5		
KATAHDIN	450	422	cde	94	6	5	1	0/40	0/40	2/40	1.057	7.7	ML	--		
R471-8*	452	395	de	87	20	7	6	0/40	0/40	0/40	1.055	6.5	M	7.5		
B8690-12*	413	375	e	91	0	7	2	5/40	1/40	1/40	1.063	7.0	M	6.5		
B8491-1*	411	372	e	90	19	4	6	4/40	1/40	0/40	1.066	6.7	ML	6.5		

* Denotes lines with golden nematode resistance.

1/ Means followed by the same letter are not significantly different at .05 level, Duncan's New Multiple Range.

2/ Culls include tubers with sunburn, growth cracks, knobs, heat sprout, enlarged lenticels, etc.

3/ Ten tubers between 3 and 3.5 in. from each rep were cut and inspected for hollow heart, brown center, and internal necrosis. Numerator = number of tubers with defect. Denominator = total number of tubers observed.

4/ Based on 1-10 scale, 10 being perfect.

5/ VE = Very Early; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late; VL = Very Late.

Variety, Spacing, Fertility Trials (Table 8).

Treatment	Total	Under		Over		US No. 1	per 10 hollow	US No. 1
		2"	2-3.5"	3.5	Culls			
<i>Belrus</i>								
7"-160	309	41a	264	1a	3a	265a	0a	86
7"-200	300	42a	255	1a	3a	256a	0a	85
9"-160	333	33a	281	15a	5a	296a	.25a	89
9"-200	307	27a	257	18a	5a	275a	.50a	90
11"-160	320	34a	270	16a	0a	286a	.25a	89
11"-200	314	30a	260	21a	3a	281a	1.5b	89
						276		88
<i>Campbell</i>								
7"-160	444	17ab	354	70c	3a	424ab	0. 5a	95
7"-200	417	17a	313	82bc	5a	395b	1. 0a	95
9"-160	449	11b	359	76bc	3a	435a	0.25a	97
9"-200	419	11b	320	85abc	3a	405b	1. 0a	97
11"-160	430	12ab	310	107a	1a	417ab	0. 5a	97
11"-200	406	10b	297	95ab	4a	392b	0.75a	96
						411		96
<i>NY61</i>								
7"-160	533	51a	426	49a	7b	475a	0.25a	89
7"-200	483	42b	387	49a	5b	436ab	0.25a	90
9"-160	438	40b	357	33a	8ab	390bc	1.25a	89
9"-200	448	36b	364	36a	12a	400bc	0.0 a	89
11"-160	400	38b	321	36a	5b	357c	2.0 a	89
11"-200	406	41b	314	45a	5b	360c	1.0 A	89
						403		89
<i>B6987-184</i>								
7"-160	427	31a	381	13a	2a	394a	0.25a	92
7"-200	425	30a	365	22a	8a	387a	0.5 a	91
9"-160	440	30a	386	20a	3a	406a	0.0 a	92
9"-200	402	25a	351	22a	3a	373a	0.75a	93
11"-160	430	23a	381	19a	6a	400a	0.75a	93
11"-200	402	21a	349	26a	6a	375a	0.75a	93
						389		92
<i>B7583-6</i>								
7"-160	497	26a	390	81a		467a	1.0 b	94
7"-200	475	32a	374	69a		443ab	0.0 b	93
9"-160	470	23a	369	78a		447ab	5.25a	95
9"-200	409	22a	302	85a		387c	3.25a	95
11"-160	458	25a	345	88a		433ab	4.75a	95
11"-200	413	19a	307	88a		395bc	4.5 a	96
						432		95

✓ Spacings are 7, 9, 11 inches apart and nitrogen rates are 160 and 200 lbs./acre.

NEW YORK STATE

J. B. Sieczka, C. A. Maatta,
M. E. Reisen and D. B. Grad

Results of Potato Variety Trials in Upstate New York

1978-1979

Sixty-four clones were entered in eight replicated experiments in upstate New York by the Vegetable Crops Department in 1979. Five were conducted at the Thompson Vegetable Research Farm at Freeville, New York on a Howard gravelly loam, two in Steuben County on upland mineral soil near Avoca, New York, and one on muck soil in Orleans county near Elba, New York. Limited data were taken at the Elba site because flooding occurred just prior to harvest. Fifty-one clones were entered in two unreplicated observational trials at Freeville, New York.

Field data for 1979 are listed in Tables 1-11. Internal necrosis was not a major problem and these data are excluded from the tables. The most promising round white clones are B7592-1, B8710-1, B8715-22, BR7093-23, NY 59, NY 61, Q54-6, Q54-11, and Q155-3. Promising russets include BelRus, Centennial Russet, B7583-6, and B8922-10.

Clones that look especially promising for the potato chip market include Atlantic, Belchip, Buckskin, Campbell-11, Monona, Norchip, Oneida, Peconic, AF186-5, AF205-9, AF223-1, B6503-2, B6986-2, B6987-43, B6987-184, B7232-4, B7592-1, FL 657, NY 61, NY 65, Q87-17, Q87-22, Q94-9, Q94-25, and Q155-3.

After-cooking darkening was not a major problem in 1978. However, Norgold 9 and B7685-8, had significantly lower ratings than the other clones tested.

Clones that lost more than 10% of total weight due to the combination of sprout weight and general shrinkage are Campbell-13, Norgold 7, Norgold 9, AF186-5, AF205-9, B6503-2, B7839-7, C7232-4, C7358-14A, and F67072.

Acknowledgements

Special thanks go to the grower-cooperators who provided time, land and equipment to conduct some of these experiments. Seed was provided by Dr. R. L. Plaisted, Cornell University; Dr. Raymon Webb, USDA; Hugh Murphy, NE107 in Maine; and Dr. Joseph Pavek, USDA.

Upstate New York Table 1. Tuber characteristics of clones in replicated trials, 1979.

Clone	Color	Texture	Shape	Depth	Clone	Color	Texture	Shape	Depth
Atlantic	Bu	S1 N	R	R	B8715-22	Bu	RS	O	R
Belchip	W	RS	O-R	F	B8751-6	Bu	S1 N	R	R
BeIRus	Br	HR	L	S1 F	B8771-6	W	S	R-0	S1 F
Butte	T	MR	L	S1 F	B8779-1	W	S	O	R
Campbell 11	W-Bu	RS	R	S1 F	B8783-6	Bu	S1 N	R	R
Campbell 12	Bu	S1 N	O-R	R-S1 F	B8799-8	BW	S	R	S1 F
Campbell 13	W	RS	R-O	S1 F	B8887-1	Bu	S1 N	R	S1 F
Centennial Russet	Br	MR	L-O	S1 F	B8922-10	T	MR	L	R-S1 F
Katahdin	W	S	R-O	S1 F	B8932-2	W-Bu	RS	R	S1 F
Kennebec	W	S	O-R	S1 F	B9053-6	Bu	RS	R	S1 F
MaineRus	Br	MR	L-O	R-S1 F	BR7093-23	W	S	O	S1 F
Peconic	W	RS	R-O	S1 F	C7232-4	Bu	RS	O-R	S1 F
Russet Burbank	T-Br	MR	L	R-S1 F	C7358-14A	Bu	S1 N	O-R	S1 F
Superior	Bu	S1 N	R-O	S1 F	CC26-1A	W-Bu	RS	O	S1 F
AF186-5	W-Bu	RS	O	R-S1 F	NY 59	W-Bu	S1 N	R	R-S1 F
AF205-9	W	RS	O-R	R-S1 F	NY 61	W-PK	S	R-0	S1 F
B6969-2	W	RS	R-O	R	NY 63	W	RS	O-R	R-S1 F
B6987-184	W-Bu	S1 N	O	S1 F	NY 64	BW	VS	O-R	S1 F
B7154-6	W	S	O	S1 F	NY 65	W	S	O-R	S1 F
B7200-33	W	S	O	S1 F	NY 66	Bu	S1 N	R-0	R-S1 F
B7516-9	W	S	R-O	S1-F	Q53-5	W-Bu	RS	O	S1 F
B7583-6	Br	MR	O	S1 F	Q54-6	W	S	R-0	R-S1 F
B7592-1	BW	VS	O	S1 F	Q54-11	W-Bu	S	R-0	S1 F
B7802-2	BW	VS	O-R	F	Q94-9	W-Bu	S1 N	R-0	R-S1 F
B7805-1	W	S	O-R	R	Q94-25	W-Bu	RS	R	R-S1 F
B8352-3	W	RS	O	R-S1 F	Q155-3	BW-W	S-VS	O-R	S1 F
B8491-1	S1 N	R-O	S1 F	R	4Q61-8	W	S	O	S1 F
B8491-24	BW	RS	R	R	4Q61-12	W	S	R-0	R-S1 F
B8687-22	Y	S	R	R-S1 F	4Q74-12	W	RS	R-0	S1 F
B8706-7	Bu	S1 N	R	R-S1 F	R471-8	Bu	S1 N	R	S1 F
B8710-1	W	S	O-R	R-S1 F	R471-62	Bu	S1 N	O-R	R-S1 F
B8710-16	BW	S	R	S1 F	R471-89	Bu	S1 N	O	R-S1 F

Abbreviations

Color - BR=brown, Bu=buf, BW=bright white, PK=pink, T=tan, W=white, Y=yellow

Texture - HR=heavy russet, MR=medium russet, RS=relatively smooth, S1 N=slight net, S=smooth, VS=very smooth

Shape - O=oblong, L=long, R=round

Depth - F=flat, R=round, S1 F=slightly flattened

Upstate New York Table 2. Cornell Golden Nematode Resistant Clones Trial, Freeville, New York, 1979

Clone ^{1/}	Yield (cwt/A)			% Kat			% of Total Yield			Defects ^{2/}			MTW ^{3/} (oz)			Spec ^{4/}			HH ^{5/}			App ^{6/}			Vine ^{7/}					
	US #1			Yield			US No 1			2 ^{1/2} -3 ^{1/4}			>4			Grav			4/			HH			5/			App		
	Total	1	7/8-4	1	7/8-4	1	7/8-2 ^{1/2}	1	7/8-2 ^{1/2}	3 ^{1/4} -4	3 ^{1/4} -4	2 ^{1/2} -3 ^{1/4}	2 ^{1/2} -3 ^{1/4}	>4																
NY 61	537	487		134		14	49	28	1	6	6	6.2	79	1	8.0															
Q54-6	560	464		128		7	37	39	5	6	7.6	84	0	7.3																
NY 59	497	435		120		6	38	44	9	3	7.8	84	0	6.3																
Q54-11	458	417		115		9	49	33	2	6	7.7	76	1	7.8																
Q53-5	464	403		112		10	57	21	0	12	7.5	86	0	6.5																
Q155-3	462	399		110		8	45	34	3	9	7.7	72	0	8.0																
4Q61-12	500	380		106		5	30	42	9	13	9.0	82	1	6.5																
R471-89	467	377		104		5	33	43	5	5	8.5	76	1	6.5																
Katahdin	453	363		100		4	39	43	11	7	8.6	75	1	7.8																
4Q61-8	422	341		95		7	41	33	2	16(G)	8.5	78	1	6.3																
Q94-25	388	340		94		5	33	50	10	2	8.6	79	0	6.0																
R471-62	424	339		93		3	31	46	6	14(G)	10.2	87	0	8.0																
Q94-9	433	326		90		7	33	35	6	15(M)	7.4	84	1	6.5																
4Q74-12	459	298		82		4	24	37	25	10	11.4	75	0	7.0																
R471-8	481	242		67		3	16	32	40	7	11.4	65	1	6.5																
Waller-Duncan (.05)	(54)	(58)										(.09)	(3)																	

^{1/} Planted May 3, 1979, harvested September 26, between row spacing 34", within row spacing 9.9", 1000 lb/A of 15-15-15 applied in bands at time of planting, vines sprayed with 2.5 lb/A dinoseb on August 31, 1979.

^{2/} Total of all defects. Defects >7% in parenthesis, major defects listed first. Abbreviations: S = sunburn, M = misshappen, G = growth cracks.

^{3/} Mean tuber weight in ounces.

^{4/} Specific gravity determined by hydrometer, 1.0 omitted.

^{5/} Average number of tubers with hollow heart and/or brown center of ten tubers cut per replication. Internal necrosis was not a major problem.

^{6/} Appearance rating based on a scale of 1 to 9; 1 = extremely rough unattractive, 9 = smooth attractive

^{7/} Vine maturity rated on September 30, 1979, on a scale of 1 to 9; 1= completely dead, 9=green and vigorous.

Upstate New York Table 3. Variety Trial I, Freeville, New York, 1979

Clone ^{1/}	Yield cwt/A		% Kat Yield		% of Total Yield			Defects ^{2/}	MTW ^{3/} (oz)	Spec ^{4/} Grav	HH ^{5/}	App ^{6/}	Vine ^{7/} Mat						
	US #1		US No 1		US No 1														
	Total	1 7/8-4	1 7/8-4	1 7/8-2½	2½-3¼	3¼-4	>4												
NY 61	521	460	117	12	46	30	3	7	6.8	78	1	7.5	5						
BR7093-23	511	409	103	5	37	38	4	15	9.3	79	0	7.0	5						
Katahdin	496	402	100	6	32	43	11	7	8.8	78	1	7.0	6						
NY 59	504	386	97	6	38	33	12	10	8.0	82	0	7.0	8						
AF186-5	424	385	97	9	62	20	1	6	7.2	78	2	6.5	4						
NY64	487	379	96	11	42	26	1	19(G)	7.3	71	1	6.8	2						
B6987-184	434	376	94	12	51	24	1	10	7.2	97	2	6.5	6						
NY65	495	372	93	9	35	32	7	15(M)	8.6	86	0	6.8	3						
Peconic	456	372	93	9	45	29	5	11(S)	7.0	81	1	7.0	4						
NY 66	496	366	92	3	25	45	14	12(S)	10.4	74	1	6.3	5						
Atlantic	493	357	91	7	31	35	8	18(M)	7.6	90	2	6.3	5						
Kennebec	514	356	89	5	37	27	3	27(MG)	9.3	82	2	5.5	5						
NY 63	505	335	85	5	28	33	9	24(G)	9.4	73	1	7.5	4						
B7802-2	371	271	69	11	47	15	1	24(M)	6.9	70	0	6.3	1						
Camp. 11	326	245	62	7	35	33	5	17(G)	7.2	85	2	8.0	4						
Waller-Duncan	(.05)	(44)	(46)						(0.8)	(4)									

^{1/} planted May 3, 1979, harvested September 26, between row spacing 34", within row spacing 9.7". See Table 2, footnote 1.

^{2/} See Table 2, footnote 2.

^{3/} See Table 2, footnote 3.

^{4/} See Table 2, footnote 4.

^{5/} See Table 2, footnote 5.

^{6/} See Table 2, footnote 6.

^{7/} See Table 2, footnote 7.

Upstate New York Table 4. Variety Trial III, Freeville, New York, 1979

Clone ^{1/}	Yield (cwt/A)				% Kat				% of Total Yield				Defects ^{2/} >4	MTW ^{3/} (oz)	Spec ^{4/} Grav	HH ^{5/}	App ^{6/}	Vine ^{7/} Mat				
	US #1		Yield		US No 1		2 1/2-3 1/2		3 1/4-4		>4											
	Total	1 7/8-4	1 7/8-4	1 7/8-4	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2	1 7/8-2 1/2										
B8771-6	489	453	110	10	53	30	1	5	6.9	78	1	6.3	3									
B8715-22	486	445	108	12	70	9	0	6	6.3	70	1	8.0	2									
B8710-1	497	430	104	10	55	21	0	10	6.5	74	1	7.3	1									
B7592-1	472	429	104	10	60	20	1	5	6.8	89	0	7.7	4									
Katahdin	470	414	100	6	44	38	4	7	7.8	78	1	7.0	4									
B8887-1	441	391	94	13	50	25	0	8	5.5	86	1	5.7	2									
B7200-33	466	389	94	22	58	4	0	12(G)	5.2	62	0	7.7	1									
B8706-7	456	381	92	9	32	44	6	8	8.3	84	2	7.0	4									
B8751-6	394	366	88	12	62	20	0	4	5.7	72	0	7.3	1									
B8783-6	395	356	86	25	59	7	0	5	4.4	81	0	7.3	1									
B8491-24	433	352	85	12	39	31	7	8	6.6	75	0	8.0	3									
B8491-1	389	349	84	8	52	30	4	4	6.8	82	0	7.0	5									
Atlantic	450	345	84	13	39	25	3	17(M)	6.2	89	4	5.7	4									
B8779-1	361	314	76	20	53	14	0	7	5.8	73	0	7.7	2									
B8710-16	429	313	76	7	29	37	8	17(GC)	7.5	71	1	7.3	2									
B7154-6	399	299	72	13	44	18	0	22(MG)	6.7	64	1	6.7	1									
B7805-1	391	268	65	5	34	30	7	22(G)	8.1	74	5	7.3	2									
B8799-8	296	267	65	14	62	14	0	7	5.9	82	0	8.0	2									
Waller-Duncan	(.05)	(64)	(57)						(0.9)	(4)												

^{1/}Planted May 7, 1979, harvested September 12 (rep. 2) and 13 (reps. 1 and 3), between row spacing 34" within row spacing 9.9". See Table 1, footnote 1.

^{2/}See Table 2, footnote 2.

^{3/}See Table 2, footnote 3.

^{4/}See Table 2, footnote 4.

^{5/}See Table 2, footnote 5.

^{6/}See Table 2, footnote 6.

^{7/}See Table 2, footnote 7.

Upstate New York Table 5. Freeville Russet Variety Trial, Freeville, New York, 1979

Clone ^{1/}	Yield (cwt/A)		% of Total Yield				Defects ^{2/}	MTW ^{3/} (oz)	Spec ^{4/} Grav	HH ^{5/}	App ^{6/}	Vine ^{7/} Mat						
	US # 1		US No. 1		ounces													
	Total	4-16 oz	0-4	4-10	10-16	>16												
B7583-6	364	283	8	45	33	5	10(G)	6.8	81	3	7.5	5						
Centennial	294	246	10	57	26	6	1	6.3	72	1	8.5	3						
B8922-10	309	232	21	63	12	0	4	4.9	67	1	8.3	3						
R. Burbank	344	223	9	45	21	3	23(M)	6.2	81	1	5.8	7						
Butte	319	216	25	62	6	1	7(M)	4.8	84	0	6.0	6						
MaineRus	274	200	11	53	20	5	11(G)	6.0	64	1	7.3	1						
BelRus	219	173	14	61	18	2	6	5.7	78	0	8.5	3						
D (.05) Tukey	(56)	(72)					(1.6)	(5)										
Other ^{8/}																		
B8932-2	252	183	16	57	15	0	12(G)	4.8	63	0	6.0	1						

Upstate New York Table 6. Steuben County Russet Variety Trial, Avoca, New York, 1979

Clone ^{1/}	Yield (cwt/A)		% of Total Yield				Defects ^{2/}	Spec ^{3/} Grav	HH ^{4/}	App ^{5/}				
	US # 1		US No. 1		ounces									
	Total	4-16 oz	0-4	4-16	>16									
B7583-6	345	293	9	85	2		4	85	0	8.0				
Butte	344	248	24	72	2		2	83	0	7.0				
BelRus	279	235	13	84	2		1	81	0	9.0				
MaineRus	300	219	11	73	4		12	73	1	7.3				
Waller-Duncan (.05)		(51)					(4)							

1/-7/

Freeville trial planted May 3, 1979, harvested September 12, within row spacing 9.9" except for Russet Burbank which is 14.5". Steuben trial planted June 1, 1979, harvested October 17, within row spacing 9". See appropriate footnotes in Table 2.

8/ B8932-2 data not included in analysis of variance.

Upstate New York Table 7. Steuben County White Variety Trial, Avoca, New York, 1979

Clone ^{1/}	Yield (cwt/A)		% of Total Yield			Defects ^{2/}	Spec ^{3/} Grav	HH ^{4/}	App ^{5/}
	US # ¹	1 >1 7/8	<1 7/8	US No. 1 >1 7/8	Total >1 7/8				
B8352-3	468	432	5	92	3	74	0	8.0	
Superior	450	400	6	89	5	79	0	6.8	
B7802-2	385	363	5	94	1	80	0	9.0	
Campbell 12	396	352	8	89	3	79	0	7.5	
AF205-9	398	348	10	88	2	85	0	8.0	
C7232-4	378	341	6	90	4	79	0	8.0	
B6969-2	378	331	5	87	8	68	0	8.0	
C7358-14A	347	303	5	87	8	80	1	7.8	
Campbell 13	332	282	7	85	8	81	1	7.3	
D (.05) Tukey	(88)	(92)			(9)				
<hr/>									
Other ^{6/}									
Q54-6	564	538	3	96	1	75	0	7.0	
4Q61-12	500	474	5	95	0	79	0	8.0	
Q54-11	448	410	9	91	0	78	2	8.0	
R471-62	384	365	3	95	2	83	0	8.0	
Q94-25	378	346	5	92	3	80	0	9.0	
Q94-9	295	263	7	89	4	84	0	8.0	

^{1/-5/} See appropriate footnotes in Table 2.^{6/} Clones below dotted line not included in analysis of variance.

Upstate New York Table 8. Variety Trial III, Freeville, New York, 1979

Clone ^{1/}	Yield cwt/A		% Kat Yield		% of Total Yield			Defects ^{2/}	MTW ^{3/} (oz)	Spec ^{4/} Grav	HH ^{5/}	App ^{6/}	Vine ^{7/} Mat						
	US #1		US No 1		US														
	Total	1-7/8-4	1-7/8-4	1-7/8-4	2 $\frac{1}{2}$ -3 $\frac{1}{4}$	3 $\frac{1}{4}$ -4	>4												
Katahdin	466	400	100	7	50	29	1	10	6.4	79	6	7.0	5						
B8687-22	367	337	84	15	70	7	0	5	5.2	79	0	7.0	1						
B7516-9	381	334	84	10	48	30	2	8	6.9	69	0	7.3	4						
CC26-1A	378	301	75	8	43	28	1	16 (M)	8.2	82	2	5.7	1						
B9053-6	364	299	75	12	33	38	5	9	6.9	71	1	7.7	1						
Waller-Duncan ^(.05)	(ns)	(74)							(1.3)	(4)									

Upstate New York Table 9. White Variety Trial on Muck Soil, Elba, New York, 1979

Clone ^{1/}	Yield (cwt/A)			% Kat Yield	App ^{2/}	2/			
	Total		>1 7/8						
	>1	7/8							
Belchipse	331			105		6.8			
Katahdin	314			100		8.5			
Atlantic	312			99		7.3			
C-13	266			85		8.5			
NY 59	264			84		8.0			
C-11	254			81		8.3			
AF186-5	253			81		8.5			
NY 61	252			80		8.0			
B6987-184	212			68		8.5			
Waller-Duncan ^(.05)	(37)								

1/-1/ Variety Trial III planted May 7, 1979, harvested September 12, within row spacing 9.6". Elba trial planted May 23, 1979, harvested September 25 within row spacing 9". See appropriate footnotes in Table 2.

New York Table 10. U.S.D.A. Observational, Freeville, New York, 1979

Clone ^{1/}	Yield (cwt/A)			% Kat Yield 1 7/8-4	% Total Yield Defects ^{2/}	MTW ^{3/} (oz)	Spec ^{4/} Grav	App ^{6/}
	Total	US # ¹	7/8-4					
Katahdin	421	346		100	15(S)	6.6	84	7
Superior	380	367		106	2	7.0	70	7
B8497-21	299	262		76	8	6.0	84	6
B8514-8	373	339		98	7	7.6	80	7
B8847-5	215	169		49	7	6.0	--	5
B8847-8	282	157		46	40(MG)	6.4	--	6
B8881-5	392	357		103	4	6.0	65	8
B8934-4	385	292		84	15(M)	5.2	78	7
B8934-5	312	106		30	60(MG)	5.5	--	6
B8937-9	232	160		46	18(MG)	4.0	--	7
B8943-4	276	244		70	4	5.0	63	6
B8972-1	309	270		78	12(G)	5.1	74	7
B8977-2	437	328		95	22(MG)	6.8	80	5
B9004-8	360	303		88	13(M)	6.6	75	8
B9016-20	370	352		101	0	6.4	68	7
B9019-24	355	308		89	10(S)	6.0	69	7
B9020-12	373	303		88	16(S)	7.5	67	7
B9023-18	370	249		72	31(G)	6.5	86	8
B9024-27	231	123		36	36(MG)	4.8	--	6
B9028-25	152	90		26	20(M)	---	--	5
B9062-5	263	237		68	7(S)	6.0	80	7
B9064-3	337	177		51	45(GMS)	7.7	--	4
B9064-10	360	179		52	46(MG)	7.0	--	3
B9073-3	380	290		84	20(S)	7.7	63	7
B9073-4	336	308		89	8(G)	7.1	73	7
B9080-6	232	198		57	14(GM)	7.2	--	5
B9097-5	302	236		68	19(G)	7.2	75	7
B9254-6	364	329		95	7	---	70	7
B9261-6	265	172		50	35(SG)	9.0	--	7
B9269-1	408	372		107	8	6.4	70	8
B9285-3	283	169		49	24(G)	8.2	78	6
B9286-4	353	329		95	5	5.4	63	8
B9295-2	305	267		77	0	4.8	73	8
B9311-7	283	149		43	43(G)	6.3	--	7

^{1/-6/}Planted May 7, 1979, harvested September 11, 1979, within row spacing 9.6".
See Table 2 for appropriate footnotes.

New York Table 11. Cornell Observational, Freeville, New York, 1979

Clone ^{1/}	Yield (cwt/A)		% Kat Yield		% Total Yield		MTW ^{3/} (oz)	Spec ^{4/} Grav	App ^{6/}	Vine ^{7/} Mat
	Total	US # ¹ 1 7/8-4	1 7/8-4	1 7/8-4	Defects ^{2/}					
Katahdin	409	329	100	9	8.4	79	7	6		
S303-8	443	300	91	26 (MS)	5.4	80	4	4		
S303-13	302	208	63	28 (G)	6.9	68	5	1		
S351-8	373	338	103	7	7.8	74	5	2		
S362-2	378	276	84	25 (G)	7.8	66	7	2		
S374-4	375	343	104	7	5.2	62	8	2		
S374-30	284	263	80	1	5.0	69	9	2		
S376-1	396	359	109	8	6.3	77	7	4		
S376-2	471	425	129	3	6.4	65	7	3		
S377-2	303	255	76	11 (M)	4.8	68	6	1		
S377-8	412	380	116	3	6.3	63	8	2		
S377-41	518	388	118	19 (SG)	8.0	74	8	2		
S377-59	553	516	157	4	12.8	73	8	4		
S378-46	222	185	56	10 (G)	4.5	65	5	1		
S423-25	397	275	84	21 (G)	8.8	63	6	1		
S425-13	246	208	63	8	5.0	60	6	2		
S425-21	272	188	57	4	7.1	65	5	1		
S1472-6	432	283	86	31 (MG)	9.6	84	5	3		
S1472-10	308	260	79	12 (G)	6.1	69	7	3		
S1473-4	170	153	47	4	5.3	75	7	1		

^{1/-}Planted May 7, 1979, harvested September 13 between row spacing 34". Within row spacing 9.9". See Table 2 for appropriate footnotes.

New York Table 12. 1978 Potato Variety Trials ^{1/}, Chip Color Results ^{2/}

Clone	Trial I		Trial II		Trial IV		Trial V		Steuben		Arkport	
	50	45-60	50	45-60	50		50	45-60	50		Wh 50	Russ 50
Atlantic			51	49		50			53			
Batoche					52	44					55	44
Belchip											52	
Belrus												47
Buckskin										51		
Butte												
Campbell-11					55	44					36	59
Campbell-12	41				45	32						
Campbell-13										47		49
Cent. Rus.												26
Hudson			33								35	
Katahdin	42	34	43	34			43					45
Kennebec	46	41	43	42						48		51
L. Superior	46	34										
Monona										54		
Nipigon										38		
Norchip	50	40								52		
Norgold 7*								30				
Norgold 9*								33				
Oneida	49	45			51	45					56	
Peconic										51		
R. Burbank	43	38						40	37			40
Superior	48	29										
A68678-1								46	44			
A69868-2			36		53	41						
AF186-5										56		55
AF193-4								51	43			
AF201-3	41											43
AF205-9					54	44						
AF223-1	51	45								54		
B6503-2	53	42								58		
B6962-2												46
B6969-2	41											
B6986-2							53					
B6987-43							52					
B6987-184			57	47		52				60		60
B7154-6*							33					
B7154-10							48					
B7252-3*							44					
B7516-7							46					
B7516-9							44					
B7583-6								43	41			46
B7592-1							52					
B7680-10								45	39			
B7685-8								45	31			
B7802-2							44					
B7805-1			34									
B7838-5*							47					
B7839-7*							33					
B7840-2							34					
D (.05) Tukey	(7)	(7)	(7)	(5)	(6)	(7)	(7)	(5)	(7)	(7)	(7)	(7)

(cont'd on next pg)

New York Table 12 (cont'd)

Clone	Trial I		Trial II		Trial III		Trial IV		Trial V		Steuben	Arkport	
	50	45-60	50	45-60	50	45-60	50	50	50	45-60	50		
												50	Wh
B7845-4*								38					
B7849-5*								45					
B8352-3								39					
B8375-1								42					
C7232-4	57	-	46	-	49	-	39	-	-	-	-	-	-
C7236-2	-	-	-	-	-	-	-	-	-	-	-	-	-
C7358-14A				40									
CD130-7R*									50	40			
F67072	34												
FL 657	49	-	42	-	32	-	-	-	-	-	57	-	36
NY 59	-	-	-	-	51	41					55		52
NY 61					39								39
NY 62													
Q52-5							48	39					
Q53-5							41						
Q54-6	-	-	-	-	-	-	34	-	-	-	-	-	-
Q54-11							44	32					
Q54-15(NY63)							33						
Q54-26(NY64)							33						
Q87-17							53	-	-	-	-	-	-
Q87-22								-	-	-	-	53	
Q94-9							56	50				55	
Q94-18(NY65)							51	49				55	
Q94-25							53	45				57	
Q155-3							52	46				56	
Q183-5(NY66)	-	-	-	-	-	-	41	-	-	-	-	-	-
4Q61-8*							49						
4Q61-12*							47						
4Q74-12*							45						
R471-8*							46						
R471-62*	-	-	-	-	-	-	38	-	-	-	-	-	-
W564-3A										30			
D (.05) Tukey	(7)	(7)	(7)	(5)	(5)	(6)		(6)	(7)	(5)	(7)	(7)	

*Not included in analysis of variance

1/ See 1977-1978 report for harvest results.

2/ Agtron M30 colorimeter readings. Standards for whole chips were discs 00 and 90 which were calibrated to give readings of 0 and 90 respectively. Minimum value for "generally acceptable color" for whole chips is about 45. Two slices of each of eighteen tubers per replication were fried in vegetable oil at 365°F. 50°F samples were stored at 50°F from time of harvest until fried. Samples from Trial I were fried on 12/12/78; Trial II, 1/16/79; Trial III, 1/19/78; Trial IV, 12/19/78; Trial V, 12/13/78; Steuben, 1/29/79; Arkport 1/25/79. The 45-60°F samples were stored at 45°F from time of harvest until 2/7/79 when the temperature was raised to 60°F. Samples were fried on 3/7/79.

New York Table 13. 1978 Potato Variety Trials, Freeville, New York. After-cooking Darkening^{1/} and Weight Loss Results^{2/}

Clone	After-cooking darkening				Sprout weight or weight loss other than sprouts expressed as % of total weight										
	Variety Trial Number				Variety Trial Number										
	I	II	IV	V	Spr	Oth	II	Spr	Oth	IV	Spr	Oth	V	Spr	Oth
Atlantic		5.0	5.0					1.2	7.3		1.5	5.2			
Belchip		5.0						2.4	7.0					2.3	5.9
BelRus				5.0										0.6	6.8
Butte				5.0											
Campbell-11	-	4.9	-	-				1.0	6.4					-	-
Campbell-12	-	5.0				1.4	5.5							-	-
Campbell-13		4.9						2.6	8.0						
Centennial Rus.				5.0										1.1	6.0
Hudson		5.0						0.2	5.2						
Katahdin	-	5.0	4.7	5.0	-		0.5	6.2		0.6	5.9		1.1	5.8	
Kennebec	-	4.7	5.0	-	-		0.4	6.3		0.3	7.3				
Late Superior		4.8					0.5	4.5							
Norchip		4.7					2.3	6.7							
Norgold 7*					4.7									5.9	4.2
Norgold 9*	-				3.7	-								7.7	4.6
Oneida	-	4.7	-	-	-		0.4	5.6							
Peconic			4.8						0.2	3.8					
R. Burbank		5.0			5.0		0.2	4.5						0.2	3.7
Superior		4.9					0.9	6.9							
A68678-1	-	-	-	5.0	-	-	-	-						0.7	3.0
A69868-2	-	-	5.0	-	-	-	-	2.4	7.3	-	-	-			
AF186-5			4.5					3.3	7.8						
AF193-4				4.5										2.1	3.7
AF201-3		4.9				1.3	5.3								
AF205-9	-	4.4	-	-	-		2.3	8.6							
AF223-1	-	4.9	-	-	-	0.5	4.3								
B6503-2		5.0				2.7	9.6								
B6969-2		4.9				1.6	5.6								
B6986-2				5.0						2.6	6.6				
B6987-43	-		4.4	-	-	-	-	-	-	1.5	6.6				
B6987-184	-	-	4.8	-	-	-	-	2.2	6.4	-	-	-			
B7154-6*				5.0						2.4	6.9				
B7154-10				5.0						0.9	3.3				
B7252-3*				4.4						0.6	6.0				
B7516-7	-	-		4.9	-	-	-	-	-	1.3	5.5				
B7516-9	-	-		4.9	-	-	-	-	-	1.2	3.8				
B7583-6					4.8							0.0	3.3		
B7592-1					5.0					0.5	4.1				
B7680-10					4.5							0.9	4.8		
B7685-8	-	-			4.1	-	-	-	-			0.6	3.3		
B7802-2	-	-	-	5.0	-	-	-	-	-	0.3	3.3				
B7805-1				5.0				0.6	7.7						
B7838-5*	-	-	-	5.0	-	-	-	-	-	0.8	4.4				
D (.05) Tukey		(0.6)	(0.7)	(0.4)	(0.8)	(1.7)	(4.7)	(1.2)	(6.2)	(1.1)	(5.0)	(1.2)	(4.8)		

New York Table 13 (cont'd)

Clone	After-cooking darkening					Sprout weight or weight loss other than sprouts expressed as % of total weight								
	Variety		Trial Number			Variety		Trial Number						
	I	II	III	IV	V	Spr	Oth	Spr	Oth	Spr	Oth	Spr	V	
B7839-7*					5.0					2.8	9.3			
B7840-2					5.0					1.3	3.9			
B7845-4*					5.0					0.3	2.6			
B7849-5*					4.4					4.2	5.7			
B8352-3					4.5					3.4	5.6			
<u>B8375-1</u>	-	-	-	-	5.0	-	-	-	-	2.5	5.1	-	-	
C7232-4		4.7					2.9	11.1						
C7236-2			4.6						0.8	5.8				
C7358-14A			4.9						6.2	11.0				
CD130-7R*					4.5							3.7	4.9	
<u>F67072</u>	-	5.0	-	-	-	2.8	7.3	-	-	-	-			
FL657		5.0				0.6	3.1							
NY 59			5.0						0.3	3.8				
NY 61			4.7						0.6	8.5				
NY 62			5.0						0.1	4.7				
Q52-5	-	-	-	5.0	-	-	-	-	-	-	-	-	-	
Q53-5				4.8										
Q54-6				5.0										
Q54-11				5.0										
Q54-15(NY 63)				5.0										
<u>Q54-26(NY 64)</u>	-	-	-	5.0	-	-	-	-	-	-	-	-	-	
Q87-17					4.4									
Q94-9				4.9										
Q94-18(NY 65)				4.9										
Q94-25	-	-	-	4.4										
<u>Q155-3</u>	-	-	-	4.4	-	-	-	-	-	-	-	-	-	
Q183-5(NY 66)				5.0										
4Q61-8*				5.0										
4Q61-12*				5.0										
4Q74-12*				5.0										
<u>R471-8*</u>	-	-	-	5.0	-	-	-	-	-	-	-	-	-	
R471-62*				5.0										
W564-3A						4.7						1.4	2.8	
D (.05) Tukey	(0.6)	(0.7)	(0.8)	(0.4)	(0.8)	(1.7)	(4.7)	(1.2)	(6.2)	(1.1)	(5.0)	(1.2)	(4.8)	

*Not included in analysis of variance

1/ Five tubers per each replication were peeled, dipped in 0.5% sodium bisulfite; cooked 7 minutes in an autoclave at 15 p.s.i. and rated from 1-5, where 1 = severe after-cooking darkening, 5 = no darkening. Trial I was cooked 2/9/79; Trial II, 2/15/79; Trial III, 2/14/79; Trial IV, 2/15/79; Trial V, 2/9/79.

2/ Stored at 50°F from time of harvest. Data for Trial I were collected 3/1/79; Trial II, 2/28/79; Trial IV, 3/2/79; Trial V, 3/1/79.

NEW YORK

R. L. Plaisted and H. D. Thurston¹

New York Breeding Program

Crossing & Seedling Production. This year 180 crosses were made. Five were heat tolerant Adg x PVX, PVY resistant Adg. Ten were late blight resistant tub x blight and bacterial wilt resistant Adg. Two were root knot resistant Adg x PVX and PVY resistant Adg. Fifteen were bacterial wilt resistant spar-sipilum x blight and BW resistant Adg. The remainder were tub x tub or tub x Adg crosses for variety selection. Parents were chosen for ability to chip and for resistance to golden nematode, PVX, PVY, Verticillium wilt, and scab. Additional crosses were made with berthaultii dirivitatives with glandular trichomes. 36,761 seedling tubers were produced for variety selection. Most of these are Tub x Adg hybrids with emphasis upon combining resistance to the Golden Nematode and PVY and PVX. Another 12,311 adg clones were produced from 372 accessions. These represent about 5 cycles of selection for adaptation. The seedlings were inoculated with PVY prior to transplanting and aphids were permitted to multiply until the plants began to show feeding injury. Roguing for virus symptoms removed about half the transplants. From the 112,387 single hills grown for variety selection, 6862 single 4-cut size tubers were saved. These are all segregating for golden nematode resistance and several for scab resistance and chip color. From 11,069 hills of the 7th cycle adg population, 262 selections were made. The majority of these should be resistant to late blight, PVY, and PVX.

Early Generation Selections. 1042 selections were made from 8770 first generation observation plots and 70 selections were made from 344 second generation observation plots. The first generation clones need to be tested yet for golden nematode resistance. In the 70 second generation clones, all but 2 are nematode resistant. Seven clones were selected from the second year yield trials and two from the third year yield trials. Their performance is presented in tables 2, 3, and 4.

Advanced Selections. The performance of the nine advanced selections is given in table 1 and their other attributes in table 4. NY61 will be considered for variety release this winter. This clone is a tuberosum x andigena hybrid. It has white flesh and a bright white skin with a pink splash. It cooks white and makes a light colored chip from 50° storage, comparable to Norchip. It is resistant to the golden nematode, leaf roll, Verticillium wilt and moderately resistant to scab, early blight, and late blight. It tends to have a heavy set of tubers and tuber size may not be large enough for some. Care is needed to avoid feathering the tubers by mechanical harvest if the skins are not adequately set. The effects of wider spacing are given in table 5. Approximately 600 cwt of Uihlein Foundation seed was produced in 1979.

¹ In cooperation with Anderson, Brodie, Ewing, Fry, Jones, Sieczka, and Tingey.

New York Table 1. Selected Clones Grown at Ithaca (6 repl), Riverhead (6 repl) and Cato (4 repl) in plots 2 rows wide by 20' long, planted at 9". 1979.

		Total	>1 7/8	>2 1/2 ^a	%>2 1/2 ^a	score ^b	hht ^c	int ^d necr.	S.G. ^e	ACD
Kat	Ith	270	261	212	78	3.52	2/24	0/24	1.063	.98
	Riv	476	459	352	74	3.73	2/60	2/60		
	Cato		402	345	86	3.54	4/24	0/24		
NY59	Ith	326	313	246	76	3.90	0/24	1/24	1.074	0
	Riv	575	554	455	79	3.40	0/60	38/60		
	Cato		487	419	86	4.0	1/36	1/36		
NY61	Ith	365	346	230	63	3.50	4/24	0/24	1.073	.62
	Riv	446	397	192	43	3.89	2/60	0/60		
	Cato		441	328	74	3.88	2/24	1/24		
NY63	Ith	293	278	222	76	4.10	2/24	0/24	1.060	.62
	Riv	528	516	441	84	4.02	2/60	2/60		
	Cato		475	428	90	4.25	2/30	0/30		
NY64	Ith	345	327	237	69	2.83	0/24	0/24		
	Riv	456	438	331	73	3.08	0/24	2/24		
	Cato		341	254	75	2.62	0/24	0/24		
NY66	Ith	265	264	225	85	3.67	0/24	0/24	1.065	.19
	Riv	479	472	411	86	3.83	1/60	0/60		
	Cato		384	351	91	3.75	0/24	0/24		
Q54-6	Ith	326	313	237	73	3.58	0/24	0/24	1.072	.31
	Riv	545	531	452	83	3.79	0/60	2/60		
	Cato		437	364	83	4.0	0/24	0/24		
Q54-11	Ith	323	315	228	71	3.33	0/24	1/24	1.068	1.19
	Riv	459	447	340	74	3.43	0/60	1/60		
	Cato		420	336	80	3.5	1/36	5/36		
Q94-9	Ith	196	185	131	67	3.37	0/24	0/24	1.065	.06
	Riv	391	382	277	71	3.55	7/60	1/60		
	Cato		354	293	83	4.0	1/24	0/24		
Q155-3	Ith	246	232	177	72	3.67	1/24	0/24	1.058	1.20
	Riv	397	379	279	70	3.86	3/60	0/60		
	Cato		386	318	82	4.0	0/24	0/24		
LSD.05	Ith	32	30	32		.51				
	Riv	40	43	48		.23				
	Cato		85	80		.53				

a. At Cato the grade was 2 1/4.

b. Appearance score (1-5; 5 best).

c. Hollow heart and brown center in largest tubers.

d. Internal necrosis.

e. Specific gravity.

f. After cooking darkening, 0 is white, 1 is gray, and 2 is dark.

Table 2. Selected clones in third year of yield trials at Ithaca (6 repl), Riverhead (6 repl), and Cato (2 repl) in plots 1 row wide by 20' long, planted at 9" (except plots at Cato were 2 rows wide).

		Total	>1 7/8	>2 1/2 ^a	%>2 1/2 ^a	Score ^b	hht ^c	int. ^d necr.	SG ^e	ACD ^f
Kat	Ith	273	272	227	83	3.17	1/36	0/36	1.063	.78
	Riv	490	474	365	75	3.58	1/30	0/30		
	Cato	8 rep	402	345	86	3.54	4/24	0/24		
4Q74-12	Ith	209	202	150	72	3.92	1/36	0/36	1.055	.75
	Riv	437	420	365	84	3.67	0/30	0/30		
	Cato	1 rep	333	288	86	3.5	0/6	0/6		
R471-62	Ith	358	351	281	78	3.58	2/36	9/36	1.063	1.12
	Riv	608	583	477	79	3.97	1/30	2/30		
	Cato	1 rep	466	387	83	3.5	0/6	0/6		
LDS .05	Ith	43	42	44		.46				
	Riv	72	69	72		.42				

Footnotes : See Table 1.

Table 3. Selected clones in second year of yield trials at Ithaca (4 repl) and Riverhead (4 repl), in plots 1 row wide by 20' long, planted at 9".

		Yield in cwt/A			2 1/2	Score ^b	hht ^c	int ^d necr.	S.G. ^e
		Total	>1 7/8	>2 1/2					
Kat (12 reps)	Ith	273	271	224	82	3.38	1/72	0/72	1.063
	Riv	497	483	385	77	3.78	1/72	0/72	
S303-8	Ith	366	350	326	89	3.12	0/24	2/24	1.071
	Riv	577	562	452	78	3.50	3/24	0/24	
S374-4	Ith	231	214	135	58	3.75	0/24	1/24	
S376-1	Ith	301	294	207	69	3.12	0/24	0/24	1.067
	Riv	442	422	319	72	3.25	0/24	0/24	
S376-2	Ith	354	333	238	67	3.75	0/24	0/24	1.058
	Riv	443	417	248	56	3.88	0/24	0/24	
S377-8	Ith	328	310	209	64	4.0	0/24	1/24	1.059
	Riv	483	463	298	62	4.12	1/24	1/24	
S377-41	Ith	343	326	231	67	3.87	0/24	1/24	1.065
	Riv	500	463	291	58	3.50	0/24	0/24	
S377-59	Ith	289	278	187	65	4.12	0/24	8/24	1.063
	Riv	485	457	332	68	3.62	0/24	1/24	
LSD .05	Riv	57	56	68		.55			

Footnotes: See Table 1.

Table 4. Attributes of Selected Clones.

	<u>GN</u> ¹	<u>LB</u> ²	<u>Scab</u> ³	<u>VW</u> ⁴	<u>PVY</u>	<u>Dormancy</u> ⁵	<u>Chip</u> ⁶
Katahdin	S	96(2)	62(5)	5.0(4)	S		
NY59	R	68(2)	31(5)	2.2(4)	S	+22(4)	No
NY61	R	97(2)	50(5)	4.7(4)	S	+ 6(3)	Yes
Katahdin		97(1)	71(3)	5.0(2)	S		
NY63	R	97(1)	93(3)	4.5(2)	S	+21(2)	No
NY64	R	100(1)	27(3)	6.7(2)	S	+ 2(2)	No
NY66	R	100(1)	1(3)	4.4(2)	S	+ 4(2)	No
Q54-6	R	100(1)	77(3)	3.2(2)	S	+18(2)	No
Q54-11	R	100(1)	17(3)	6.5(2)	S	+20(2)	No
Q94-9	S	100(1)	1(3)	7.0(1)	S	+15(1)	Yes
Q155-3	S	100(1)	25(3)	5.5(2)	S	+24(2)	Yes
Katahdin			68(2)	5.0(2)			
4Q74-12	R		61(2)	5.5(2)	S	+ 9(1)	No
R471-62	R		34(2)	5.6(1)	S	0	No
Katahdin		97(1)	46(1)	4 (1)			
S303-8	R	100(1)	50(1)	6 (1)	R		No
S374-4	R	100(1)	38(1)	5 (1)	S		No
S376-1	R	75(1)	6(1)	6 (1)	R?		No
S376-2	R	90(1)	13(1)	7 (1)	R?		Yes?
S377-8	R	97(1)	8(1)	6 (1)	R?		No
S377-41	R	90(1)	25(1)		S		No
S377-59	R	97(1)	11(1)	6 (1)	S		No

1. Resistance to *Globodera rostochiensis* race A.
2. % defoliation from late blight on 9/11/78 and 9/19/79.
3. Avg. scab index (no. of years) Chippewa rated at 100.
4. Avg. Verticillium wilt reaction (no. of years). Lower value more resistant.
5. No. of days to 1/2" sprouts @ room temp. relative to Katahdin.
6. Acceptable chip color after 50° storage.

Table 5. Spacing Trial of NY61 at Ithaca, N.Y.
Six replications of 20' plots.

	<u>Spacing</u>	<u>Total</u>	<u>Yield in Cut/A</u>		<u>% > 2 1/2</u>	<u>Appear. Score</u>	<u>Hollow heart</u>	<u>Internal necrosis</u>	<u>S.G.</u>
			<u>>1 7/8</u>	<u>>2 1/2</u>					
Katahdin	9"	272	271	220	81	3.70	2/30	0/30	1.063
NY61	9"	346	318	214	62	3.67	2/36	0/36	1.073
NY61	12"	367	339	246	67	3.75	4/36	0/36	

Table 6. Accumulated information on the performance of NY61.

NY61 = Wauseon x J171-8

Yield relative to Katahdin

	<u>No. of Trials</u>	<u>Total</u>	$\geq 1\frac{7}{8}$	$\geq 2\frac{1}{4}$ or $2\frac{1}{2}$
Ithaca	7	118%	110%	89%
Riverhead	5	107%	100%	82%
Cato	4	129%	119%	104%
		<u>Total</u>	<u>U.S. #1</u>	
Freeville	4	117%	124%	
Arkport	2	122%	117%	
Riverhead	3	97%	92%	
Ohio	2			112% of Kennebec

Size: 61% $\geq 2\frac{1}{4}$ " or $2\frac{1}{2}$ " compared with 80% for Katahdin in 16 trials.

Appearance rating: 4.0 compared with 3.9 for Katahdin in 17 trials.

Internal Defects:	<u>No. of trials</u>	<u>No. of tubers</u>	<u>Hollow heart</u>	<u>Internal Necrosis</u>
NY61	16	705	4%	2%
Katahdin	16	722	5%	2%
After Cooking Darkening:				
		<u>White</u>	<u>Gray</u>	<u>Dark</u>
NY61		71%	23%	6%
Katahdin		45%	42%	13%

Chip Color: Acceptable from 50° storage in 7 years.

Specific Gravity:	<u>Breeding Trials</u>	<u>Extension Trials</u>
NY61	1.075	1.073
Katahdin	1.073	1.068
Number of Sites	8	8

Vine Maturity: equivalent to Katahdin

Dormancy: One week longer than Katahdin

Disease Reaction:

Golden Nematode: Resistant

Verticillium Wilt: Resistant (4.7 vs. 5.0 for Katahdin, 4 years)

Scab: Similar to Katahdin (index 50 vs. 62 for Katahdin, 5 years)

Late blight: Similar to Katahdin.

Early blight: Resistant

Leaf Roll: Resistance between Katahdin and Abnaki

Most frequently noted comments:

small size

feathering

NORTH CAROLINA

F. L. Haynes

Breeding Program

Earliness, scab resistance, processing quality and adaptation to the Tidewater area continue to be the primary objectives of the breeding program. More than 80 percent of the crop is processed as chips and another 5 percent is utilized as frozen french fries. A small percentage is canned and the remainder is marketed as fresh table stock. This pattern of usage is not expected to change appreciably in the near future.

Seedling Production and Clonal Maintenance. The summer hybridization program was conducted at Waynesville. Clonal maintenance and increase from tuber-indexed seed tubers was conducted at the same mountain location.

Eastern Trials. Three locations in the early commercial area were planted to performance trials of selected clones. The results are presented in N. C. Tables 1, 2, and 3. The Atlantic variety continued to be outstanding in both yield and processing quality. Croatan continued to perform well in both yield and chip color. Specific gravity of the latter was not outstanding. Belchip was more variable than Atlantic. Dakchip appeared to perform well at a single location. This variety will be tested further. The clone 72C75-2 continued to be outstanding in yield and acceptable in chipping, while 71C15-20 continued to produce very high dry matter.

Adaptation Study

The base population of hybrids of the cultivated diploids *S. phureja* and *S. stenotomum* has very little remaining segregation for response to short photoperiod after six cycles of selection for adaptation to the long photoperiods of summer days in the Temperate Zone. Seed lots of the base population are stored for future use but the total base population is no longer being grown annually. In 1978 efforts in the program were concentrated in three areas: 1) The evaluation of the population for tolerance to high temperature growing conditions, 2) the establishment of a sub-population of germplasm with high levels of tuber dry matter, and 3) the identification of plants producing unreduced gametes and their utilization in hybrids with commercial tetraploid parents.

Field evaluations for heat tolerance begun in 1977 were continued in 1979. Genotypes that produced higher yields (greater than 500 grams) in single hills in 1978 were planted in replicated trials at two locations in 1979 and were planted for a crossing block and tuber increase at Fletcher. Forty-eight selected clones were planted in replicated trial at the Tidewater Station and 31 clones in the trial at Castle Hayne. Plots consisted of 5 hills x 4 replications in a randomized complete block design at each location. Both locations are near the coast where in July and August temperatures and rainfall reach a level equal to that of the lowland tropics. Superior clones

were identified and the information utilized to determine parental clones for crossing at Fletcher. Seedling populations of the new cycle will be evaluated in 1980 and will be compared to the surviving clones from 1979. A new sample of the base population will also be screened at these locations in 1980, thus expanding this phase of the project.

The high dry matter study was expanded. Of the 130 clones grown in 1978, 60 were selected to plant in replicated trials at three locations in 1979. These were planted in 6-plant plots with 3 replications. Two locations were in the Tidewater area and were subjected to the same environment as the heat-tolerance evaluation. The third location was at Fletcher. In both high temperature locations, 22 clones produced both acceptable yields and high dry matter, 5 clones were stable for high dry matter but were low in yield. The remaining 33 clones were variable or produced low dry matter under high temperatures. The 27 superior clones will be evaluated again in 1980. These are also being selectively intercrossed and out crossed to tetraploids for further study.

The 130 selected high dry matter clones were also used as an interbreeding seed nursery in 1978. From this nursery, 78 families were planted in 1979. A population of 13,000 segregates (165 per family) was grown. From this population 570 clones were selected on the basis of tuber type and yield for evaluation for high dry matter. These selections represent the third cycle of breeding within the high dry matter population. Specific gravities of the selections from 25 families are presented in N. C. Table 4 and are compared to the specific gravities of the female parent clones. It is apparent from this table that there are wide differences among clones for general combining ability for dry matter.

Hybridization of both heat-tolerant selections and high dry matter clones with commercial tetraploids and with other selections is being accomplished. The parallel spindle gene has been introduced to certain clones, thus increasing the probability of recovering clones producing 2n gametes with first division restitution. This phase of the project will be expanded.

North Carolina Table 1. Potato performance trial in Tyrell County. Plots were 1 row, 27 ft. long, 4 replications of 40 entries in RCB, 36 hills/plot. Spacing in row 9 inches. Width row, 40 inches. Lb/plot x 4.84 = cwt/A. Fertilized: 1400 lb./A 10-20-20 banded. Total/A. 140 lbs. N, 280 lbs. P₂O₅, 280 lbs K₂O. Planted 3/19/79, harvested 6/27/79 (100 days).

Variety	Total cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
73C26-5	378	90.8	1.058	5.7	7.0	Midseason
B8433-4	364	87.0	55	4.3	7.0	Midseason
72C75-2	364	80.3	61	5.3	7.0	Med. early
73C1-3	355	81.5	67	4.7	6.8	Midseason
73C25-2	324	89.5	54	5.7	6.8	Midseason
B8218-4	322	81.2	-	-	6.8	Midseason
Atlantic	313	85.8	75	3.3	7.0	Midseason
B8477-4	298	86.9	61	3.7	7.3	Midseason
73C1-4	297	84.6	67	5.0	7.0	Midseason
Pungo	295	90.9	62	4.7	7.0	Midseason
73C26-4	294	94.6	65	3.7	7.0	Midseason
B7583-6	292	62.4	63	5.3	6.5	Med. early
Belchip	289	83.4	62	2.7	7.0	Midseason
73C26-1	278	90.6	58	5.3	8.8	Early
B8706-N2	278	78.7	60	5.7	6.8	Med. early
73C28-4	276	91.2	46	6.0	7.0	Med. early
B8073-3	275	80.1	55	4.0	7.3	Early
B7151-4	272	88.4	74	4.3	7.3	Med. early
Croatan	272	84.0	54	5.3	7.3	Med. early
71C15-20	270	92.0	84	3.7	8.0	Med. early
72C75-3	270	81.0	62	4.0	7.5	Med. early
Norchip	267	86.7	66	3.7	7.3	Med. early
B8686-8	267	84.4	78	2.7	7.5	Med. early
73C26-3	258	87.3	52	4.7	8.0	Early
B7154-6	252	72.4	-	-	8.5	Early
B8644-N1	244	89.1	62	3.3	7.0	Midseason
73C22-1	239	82.3	61	3.7	6.5	Med. early
73C17-3	239	81.3	53	5.3	6.0	Med. late
Sebago	229	90.7	49	4.7	6.8	Med. late
B6987-184	228	71.0	76	2.3	7.0	Med. early
Superior	225	91.0	63	4.0	8.0	Early
B8615-2	217	89.1	68	2.3	8.0	Med. early
B6969-2	215	78.9	50	4.3	7.8	Early

North Carolina Table 1 continued.

72C5-2	203	87.7	59	2.3	8.0	Early
73C20-1	197	92.6	70	3.3	7.5	Med. early
Belrus	194	76.4	61	3.0	7.8	Med. early
B7516-9	194	74.0	57	4.0	8.5	Early
B8285-3	192	64.8	-	-	7.0	Med. early
72C68-3	188	85.4	65	5.7	7.0	Med. early
B8852-2	157	67.5	-	-	8.0	Med. early
L.S.D. .05		51				
C.V. (PCT)		13.4				

1/ Chip color determined by Wise Foods, Borden, Inc., Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1 = perfect; 5 useable but not desirable, 6-14 unacceptable with 14 = black.

2/ Appearance
1 = Very poor
3 = Poor
5 = Fair
7 = Good
9 = Excellent

North Carolina Table 2. Potato performance trial at Weeksville. Plots were 1 row, 27 ft. long, 4 replications of 24 entries in RCB, 36 hills/plot. Spacing in row, 9 inches. Width row, 40 inches. Lb./plot x 4.84 = cwt/A. Fertilized: 430 lb./A. 10-20-20 BDCST and plowed in. 1600 lb./A. 10-20-20 banded. Total/A. 203 lbs. N, 406 lbs. P₂O₅, 406 lbs. K₂O. Planted 3/21/79, harvested 6/28/79 (98 days).

Variety	Total cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appearance ^{2/}	Maturity
72C75-2	337	76.8	1.065	4.7	7.7	Med. early
73C26-5	331	86.1	55	6.0	7.0	Midseason
73C25-2	311	86.4	54	6.0	7.3	Med. early
ND8891-3	301	77.2	57	6.0	7.7	Med. early
Pungo	300	82.5	64	4.3	7.0	Med. early
Dakchip	298	76.7	56	4.0	7.0	Midseason
Croatan	279	81.1	58	4.7	7.0	Med. early
Norchip	278	82.4	59	3.7	7.0	Early
72C75-3	277	69.2	59	5.7	7.3	Med. early
Atlantic	269	82.0	77	3.7	7.3	Midseason
73C1-4	268	78.7	66	5.7	7.3	Med. early
73C26-4	253	84.3	56	4.7	7.3	Med. early
73C1-3	245	76.0	73	5.7	7.0	Midseason
B8706-N2	232	65.9	-	-	6.7	Med. early
Belchip	230	81.2	62	4.0	6.7	Midseason
B9004-N6	229	80.1	67	6.3	7.0	Med. early
Superior	224	84.4	59	4.0	8.0	Early
71C15-20	213	84.7	90	3.3	7.0	Med. early
B9003-N4	206	77.0	58	6.7	8.0	Med. early
B9003-N5	196	71.9	58	6.0	7.7	Med. early
Oceana	187	79.5	52	5.0	8.7	Early
71C4-5	187	83.2	81	4.0	7.0	Midseason
73C17-3	178	74.4	63	6.0	6.0	Med. late
B9010-N4	124	79.3	63	6.7	8.3	Early
L.S.D. .05	52					
C.V. (PCT)	12.4					

1/ and 2/ See footnotes, N.C. Table 1.

North Carolina Table 3. Potato performance trial at Tidewater Research Station, Plymouth. Breeding clone trial. Plots were 1 row, 30 ft. long, 26 replicated entries, 24 augmented entries (6 per rep.), 4 replications in RCB W/aug. ent. design. 36 hills per plot. Spacing in row, 10 inches. Width row, 38 inches. Lb./plot x 4.585 = cwt/A. Fertilized: Total/A. 100 lbs. N, 200 lbs. P₂O₅, 200 lbs. K₂O banded. 30 lb./A N applied midseason. Planted 3/15/79, harvested 6/29/79 (105 days).

Variety	Total cwt/A	Percent US#1-A	Appearance ^{2/}	Maturity
Replicated entries				
Pungo	281	83.3	7.0	Midseason
73C26-5	280	84.8	7.0	Midseason
R. LaSoda	275	87.9	7.0	Med. early
Belchip	255	88.4	7.0	Midseason
Croatan	249	85.0	7.8	Med. early
B9003-N4	248	83.3	9.0	Med. early
Atlantic	247	82.8	7.7	Midseason
72C75-2	247	76.4	7.8	Med. early
Norchip	245	82.3	7.0	Med. early
73C26-4	244	90.3	7.2	Med. early
Superior	240	86.9	7.2	Early
72C75-3	237	79.9	7.5	Med. early
73C28-4	230	82.1	7.0	Med. early
B8737-N4	225	85.9	7.0	Med. early
73C26-1	212	86.1	7.7	Early
71C15-20	205	87.0	7.5	Med. early
73C26-3	205	86.9	7.7	Early
B7583-6	202	56.3	7.2	Med. early
73C20-3	201	78.9	7.5	Med. early
73C22-1	200	84.8	7.0	Midseason
B8579-N1	195	85.6	7.5	Midseason
B8755-N7	194	77.7	8.0	Early
72C5-2	192	81.3	7.3	Med. early
73C17-3	177	71.6	6.2	Midseason
B8755-N9	175	83.4	7.5	Med. early
73C20-1	169	83.6	7.2	Med. early

North Carolina Table 3 continued.

Augmented entries - Rep I - adjusted yields

B9455-N5	289	70.2	7.0	Midseason
B8741-N4	238	78.0	8.0	Med. early
72C68-3	219	87.2	8.0	Med. early
75C8-7	197	80.3	7.0	Med. early
B9010-N4	193	70.6	8.0	Early
75C6-1	158	93.8	8.0	Med. early

Augmented entries - Rep II - adjusted yields

B9004-N6	240	80.1	6.0	Med. early
B9455-N4	204	86.5	7.0	Early
Sebago	191	83.0	7.0	Med. late
Belrus	179	83.6	8.0	Med. early
B8644-N1	178	83.8	7.0	Med. early
B9456-N5	175	92.9	7.0	Med. early

Augmented entries - Rep III - adjusted yields

B9336-N10	250	87.0	9.0	Early
B9455-N9	240	88.6	8.0	Med. early
B9003-N5	222	78.4	8.0	Med. early
71C4-5	188	85.2	8.0	Med. early
B9346-N1	132	65.2	8.0	Early
B8755-N1	106	76.7	7.0	Med. early

Augmented entries - Rep IV - adjusted yields

B9484-N1	325	85.1	7.0	Midseason
B8519-4	313	88.7	8.0	Midseason
75C2-5	263	94.9	8.0	Med. early
B9476-N2	256	86.1	8.0	Early
B9384-N2	253	83.1	8.0	Early
B9479-N3	189	82.2	7.0	Med. early

L.S.D. .05 RE 35

L.S.D. .05 AE Same R. 70

L.S.D. .05 AE Dif R. 71

L.S.D. .05 RE vs AE. 57

C.V. (PCT) 11.1

2/ See footnote, N. C. Table 1.

North Carolina Table 4. Progress in selection at Fletcher for high dry matter within diploid potato families. Specific gravity determined by weight in air and weight in water of a 400 to 600 gm. sample.

Clone	Female Parents Specific Gr.	1979 Clonal selections		
		No.	Ave. S.G.	Highest Clone
DM3	1.098	21	1.103	1.125
DM5	1.098	13	1.090	1.116
DM8	1.090	25	1.094	1.110
DM13	1.112	22	1.096	1.156
DM14	1.109	10	1.099	1.111
DM15	1.100	10	1.103	1.134
DM16	1.090	14	1.096	1.110
DM27	1.116	11	1.103	1.117
DM29	1.109	10	1.098	1.114
DM35	1.108	8	1.111	1.128
DM36	1.104	4	1.101	1.112
DM40	1.101	13	1.096	1.106
DM41	1.123	10	1.104	1.115
DM45	1.106	4	1.106	1.117
DM47	1.095	23	1.087	1.106
DM52	1.126	7	1.101	1.116
DM54	1.117	9	1.101	1.126
DM56	1.113	9	1.103	1.116
DM61	1.108	12	1.106	1.118
DM63	1.121	9	1.099	1.114
DM70	1.096	6	1.098	1.112
DM75	1.126	9	1.099	1.117
DM79	1.135	6	1.106	1.127
DM80	1.109	15	1.105	1.147
DM91	1.122	6	1.106	1.121

NORTH DAKOTA

R. H. Johansen, B. Farnsworth, G. Secor, W. Rostedt and P. Nolte

Breeding Program

Crossing and Seedling Production. Potato crosses were again made in the green-house during February through May of 1979. A total of 241 crosses were made with breeding emphasis being made on high yield, russetting, good red skin color, processing qualities, high solids and disease resistance. A planting of approximately 60,000 seedlings was also grown in the greenhouse during July through November. These seedlings will be planted at the Langdon Station in the spring of 1980.

In 1979, 52,925 seedlings were grown in the field at the Langdon Experiment Station and approximately 1,000 were saved at harvest for further testing and evaluation. The seedlings at Langdon were planted on May 23, 24 and 25 and harvested on September 24, 25 and 26th.

Advanced Selections. One thousand seventy-two second year, 88 TND second year, 138 third year and 103 fourth year and older selections were planted at Grand Forks and Casselton. Eighty-two selections and cultivars from other states were also planted at Grand Forks. A large seed increase of third year and older material was made at Casselton and Plant Pathology planted a two tuber unit planting of the second year selections at Absaraka and a ten hill planting of the third year and older material at Casselton. At Grand Forks two replicates of the second year selections were planted in separate blocks. The plots at Grand Forks were planted on May 24th and harvested on September 6, 10, and 18th.

Promising Selections. Dakchip, formerly ND8888-2, was named in 1979. This selection seems to have only fair acceptability as a new cultivar.

Line ND8891-3 continues to look promising and will be named in 1980. This selection seems to have fair to good chipping quality and excellent yield. Several states report ND8891-3 as their highest yielding entry in their respective trials. Line ND8891-3 is oblong in shape with smooth, uniform type tubers.

Another selection, A68678-1 from the USDA potato breeding program at Aberdeen, Idaho looks very promising. This selection has russet skin, long type and produces fair yield and very high total solids.

Other North Dakota selections that look promising are ND455-1Russ, ND534-4Russ, ND55-7, ND372-2R, ND258-1, TND 14-1Russ, ND146-4R and ND8850-2. Foundation seed growers at Beach and the Red River Valley are presently increasing most all of the outstanding North Dakota advanced selections and A68678-1.

Cultivar Trials. Replicated trials were again planted at Grand Forks, Park River, Williston and Minot. Wayne Grinde, County Agent in Walsh County, was in charge of the Park River trial while Dennis Askim, Farm Manager of the Potato Research Farm was in charge of the general maintenance of the Grand Forks Trial. Super-intendents Ernie French and Ben Hoag were in charge of the Williston and Minot trials, respectively.

The entries in trial were grown in plots of 25 hills and replicated four times in a randomized block. Thirteen entries were grown at all locations while 12 selections were tested only at Grand Forks and Park River. Marketable yield consisted of all U.S. No. 1 tubers over 1 7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer. Environmental data for the trials are found in Table 1.

Table 1. Spacing, fertilizer, soil type, planting and harvest dates of the 1979 trial.

Location	Spacing		Fertilizer	Soil Type	Planting	Harvest
	Row (in.)	Plant (in.)			Date	Date
Grand Forks	38	12	22-22-12/200#/A	Bearden Clay Loam	5/23	9/17
Park River	38	12	Fall Broadcast	Glyndon Silt Loam	5/15	9/5
Minot	38	14		Williams Loam	5/22	9/28
Williston	36	16	None	Williams Sandy Loam	5/25	9/17

The growing season was quite variable between eastern and western North Dakota. The Grand Forks location received 8.17 inches of rainfall during the season with the largest amounts or about half of the total rainfall occurring in July. It was quite dry at Grand Forks during August and September. A similar situation occurred at Park River, however, the total rainfall there was approximately four inches more. The seasonal temperature in eastern North Dakota was not extremely hot.

In western North Dakota it was very dry throughout the season. From May through August only 5.04 inches of precipitation was recorded at Minot. The heaviest rainfall at Minot occurred on July 1 when 1.13 inches fell. A very similar dry condition occurred at Williston; however, again temperatures in western North Dakota were not extremely hot.

When considering yield data from all locations, ND8891-3 produced the highest U.S. No. 1 yield and Red Pontiac was second. Yield data from Grand Forks and Park River showed ND258-1 to be the highest yielding entry; however both ND8891-3 and Red Pontiac were next in yield when averaging only the yield at Park River and Grand Forks, North Dakota (Table 2).

Dakchip, ND146-4R, Norland and Kennebec also produced fairly high yield. Line A68678-1 produced U.S. No. 1 yields averaging above both Norgold Russet and Russet Burbank. Line ND137-2Russ and Russet Burbank were the lowest yielding entries in trial (North Dakota Table 3).

Because of the dry conditions, very low yields were recorded in western North Dakota. Yields at Grand Forks and Park River were quite similar, averaging 200 and 188 cwt per acre, respectively.

Line A68678-1, Norchip, ND8891-3 and Dakchip produced the highest specific gravity and percent total solids. Lines ND194-7, AND7422-1Russ, ND372-2R, ND258-1, and ND8850-2 all averaged above 1.090 specific gravity when tested at Grand Forks and Park River.

The extreme dry conditions in western North Dakota resulted in very high total solids from the trials grown at Minot and Williston. Low yields coupled with dry conditions generally always give very high specific gravities.

Specific gravities at Park River and Grand Forks were quite similar, however ND8891-3 did have a much higher specific gravity at Park River.

Processing and Culinary Trials. Chip tests for cultivars and selections grown in the trial at Park River were again conducted during the winter of 1979. Flooding late in the season eliminated the Grand Forks trial in 1978. The trial at Park River was stored for several weeks at 40° and then chipped out with no reconditioning and then reconditioned for one week and three weeks. Chip color was determined by the Standard PCI Color Chart and the photovolt. For the most part, chip quality was very poor for the 1978 crop (Table 4).

One hundred and thirty-one second year selections and 103 third year and older selections were tested for chip quality by the Potato Research Lab at East Grand Forks, Minnesota. Nineteen second year selections and eight of the third year and older selections had Agtron readings above 40 after being reconditioned. Sucrose tests were again done on all advanced selections.

French fry and flake samples were again made by the Potato Research Lab. The french fried samples were evaluated for quality by the Home Economics Department at NDSU.

Cooking tests consisted of boiling and baking a sample of each entry grown in the trials at Park River. The Grand Forks trial was lost due to flooding in 1978. Sloughing and after-cooking darkening was not a serious problem in 1978. Lines A68678-1 and ND8891-3 both were quite outstanding as boiling and baking potatoes (North Dakota Table 5).

Disease Resistance and Control. Evaluation of selections for scab and silver scurf resistance was conducted at the Potato Research Farm, Grand Forks. Each selection was represented by ten hills each. Twelve hundred selections were evaluated; some appeared to have excellent resistance, with only a trace of disease present. Resistance to silver scurf was observed in over 50% of the selections.

Advanced selections that are potential new cultivars were evaluated for resistance to *Verticillium*, late blight and PVX. Late blight and PVX resistance were evaluated in greenhouse trials and *Verticillium* resistance in *Verticillium* infested field plot. Four selections were resistant to late blight (race 0), two selections tolerant to *Verticillium* and no selections were resistant to PVX.

Eleven hundred second year selections were grown in a potato free area. These selections were evaluated for disease and horticultural characters.

Three hundred advanced selections were indexed for spindle tuber using gel electrophoresis and 150 advanced selections indexed for PVX using serology. Disease-free selections were maintained for breeding purposes and further evaluation as potential new cultivars.

Representative tubers of selections from these two plots were grown in Florida for winter indexing for virus diseases.

North Dakota Table 2. U.S. No. 1 Yield and Percent U.S. No. 1 of Potato Cultivars and Selections Grown in State-Wide Trials - 1979

Cultivar	Grand Forks			Park River			Minot			Williston		
	Cwt/A	No. 1	% U.S.	Cwt/A	No. 1	% U.S.	Cwt/A	No. 1	% U.S.	Cwt/A	No. 1	% U.S.
Red Pontiac	244	96	252	96	136	89	109	93	185			
ND8891-3	243	94	237	90	123	82	108	90				178
Dakchip	249	93	258	92	74	76	98	82				170
ND146-4R	244	90	223	92	100	80	89	89				164
Norland	228	94	193	94	98	77	124	94				161
Kennebec	201	94	219	92	105	80	100	89				156
Viking	208	96	179	97	133	93	96	96				154
A68678-1	194	89	223	91	113	80	83	82				153
Norgold Russet	234	89	183	90	68	57	96	80				145
Bison	191	96	165	86	99	81	89	90				136
Norchip	176	80	180	79	76	58	88	73				130
Russet Burbank	110	65	172	79	45	34	90	72				104
ND137-2Rus	142	78	121	70	56	46	57	55				94
ND258-1	234	88	296	92								265
ND372-2R	226	93	247	87								237
ND55-7	224	92	226	87								225
ND294-1R	226	93	201	85								214
ND8850-2	236	91	177	84								207
ND329-4Rus	226	89	176	83								201
ND206-1R	235	95	158	91								197
ND119-3	189	92	158	87								174
ND9476-5	146	91	137	86								142
ND194-7	132	85	143	82								138
ND248-3	146	84	102	84								124
AND7422-1Rus	119	62	78	48								99
Average	200	85	188	75	94	72	94	83				166

North Dakota Table 3. Specific Gravity and Total Solids of Potato Cultivars and Selections Grown in the State-Wide Trial - 1979

Cultivar	Grand Forks			Park River			Minot			Williston			Average
	Sp. Gr.	% Solids	Sp. Gr.	% Total Solids									
A6867-8-1	92	22.2	87	21.2	116	27.4	125	29.3	105	25.0			
Norchip	93	22.4	94	22.7	109	25.9	116	27.4	103	24.6			
ND8891-3	83	20.3	93	22.4	106	25.2	113	26.7	98	23.5			
Dakchip	88	21.4	93	22.4	96	23.1	118	27.8	98	23.5			
Kennebec	86	20.9	90	22.0	99	23.7	106	25.2	95	22.9			
Norgold Russet	84	20.5	90	22.0	97	23.3	106	25.2	94	22.7			
Russet Burbank	84	20.5	90	22.0	95	22.9	108	25.7	94	22.7			
Viking	80	19.7	83	20.3	103	24.6	108	25.7	93	22.4			
ND137-2Rus	80	19.7	86	20.9	102	24.4	106	25.2	93	22.4			
ND146-4R	83	20.3	86	20.9	92	22.2	97	23.3	89	21.6			
Red Pontiac	84	20.5	79	19.4	94	22.7	102	24.4	89	21.6			
Bison	86	20.9	80	19.7	93	22.4	100	24.0	89	21.6			
Norland	82	20.1	81	19.9	91	22.0	97	23.3	87	21.2			
AND7422-1Rus	95	22.9	98	23.5					96	23.2			
ND194-7	93	22.4	99	23.7					96	23.1			
ND258-1	92	22.2	96	23.1					94	22.7			
ND372-2R	95	22.9	93	22.4					94	22.7			
ND55-7	90	22.0	96	23.1					93	22.6			
ND8850-2	90	22.0	90	22.0					90	22.0			
ND294-1R	83	20.3	88	21.4					85	20.9			
ND9476-5	87	21.2	84	20.5					85	20.9			
ND206-1R	81	19.9	87	21.2					84	20.6			
ND248-3	80	19.7	87	21.2					83	20.5			
ND119-3	81	19.9	80	19.7					80	19.8			
ND329-4Rus	79	19.4	82	20.1					80	19.8			
Average	86	20.3	88	21.5	99	23.8	108	25.7	81	22.2			

North Dakota Table 4. 1979 Chip Tests of Cultivars and Selections Grown at Park River, North Dakota - 1978

Cultivar	0 weeks - 40° F			2 weeks - 68° F			3 weeks - 68° F		
	Color ^{1/} Chart	Photo volt ^{2/}	Yield ^{3/}	Color Chart	Photo volt	Yield	Color Chart	Photo volt	Yield
Atlantic	10.5	6.0	35.5	8.5	12.0	34.5	9.0	11.0	33.0
Bison	11.0	5.0	31.0	8.5	14.0	31.3	8.0	18.5	30.8
Butte	11.0	4.0	31.8	10.0	7.5	30.8	10.0	9.0	30.5
Kennebec	10.5	5.0	31.0	8.0	16.0	31.3	8.0	18.0	31.3
Norchip	10.0	5.0	33.3	10.0	10.0	35.5	8.0	16.5	33.8
Norgold Russet	11.0	5.5	32.0	9.0	15.0	32.0	10.0	13.5	31.0
Norland	10.0	7.0	30.5	9.0	13.0	30.8	8.5	15.0	29.0
Red Pontiac	11.0	5.0	32.5	10.0	10.0	29.3	10.0	9.0	30.3
Russet Burbank	11.0	4.0	33.5	9.0	12.0	33.0	9.0	14.0	32.0
Viking	11.0	3.5	30.8	10.5	8.0	30.8	10.0	9.5	29.8
A68678-1	10.0	7.0	32.5	9.0	11.5	34.5	9.0	12.0	32.5
ND8751-16	11.0	5.5	34.0	9.0	12.5	34.0	8.5	15.0	34.0
ND8850-2	11.0	5.0	32.0	10.0	11.0	30.8	9.0	16.5	30.8
ND8888-2	10.5	6.0	32.5	8.5	13.0	32.5	9.5	10.0	33.8
ND8891-3	10.5	5.0	33.0	9.0	11.5	34.3	8.5	14.0	34.5
ND9516-4R	10.5	5.0	31.0	8.0	15.0	29.3	9.0	11.0	28.8
Average	10.7	5.2	32.3	9.1	12.0	32.1	9.0	13.3	31.6

^{1/} Color Chart (1 light, 11 dark)
^{2/} Photovolt - Higher numbers are lighter in color
^{3/} Yield - Percent chip yield

North Dakota Table 5. 1979 Cooking Tests of Cultivars and Selections Grown at Park River, North Dakota - 1978.

Cultivar	Boiling						Baking					
	Slough-ing _{1/}	Meali-ness _{2/}	Color		Color		Meali-ness	Color	Flavor	Meali-ness	Color	Flavor
			After Cooking _{3/}	After 4 Hours	Cooking _{4/}	Flavor _{5/}						
Atlantic	8.0	10.0+	9.0	7.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.5
Bison	10.0	8.0	9.0	7.0	8.5	8.5	8.0	9.0	9.0	9.0	9.0	9.0
Butte	9.5	8.5	9.5	9.5	8.5	8.5	8.0	10.0	10.0	10.0	10.0	8.5
Dakchip	9.0	9.5	9.5	8.0	10.0	10.0	10.0	8.0	8.0	9.5	9.5	9.0
Kennebec	8.0	10.0	9.5	8.5	10.0	10.0	10.0	8.5	8.5	10.0	10.0	8.5
Norchip	8.5	9.5	10.0	8.5	9.5	9.5	9.5	8.0	8.0	9.5	9.5	9.5
Norgold Russet	9.0	9.0	9.5	8.0	9.5	10.0	10.0	8.5	8.5	10.0	10.0	10.0
Norland	9.0	8.5	9.0	9.0	10.0	9.0	9.0	6.5	6.5	9.0	9.0	8.5
Red Pontiac	9.5	8.5	10.0	9.0	10.0	10.0	10.0	7.5	7.5	9.5	9.5	8.5
Russet Burbank	9.0	8.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	10.0	10.0	10.0
Viking	10.0	8.0	10.0	8.0	10.0	9.0	9.0	6.0	6.0	9.5	9.5	9.0
A68678-1	8.5	9.5	9.5	8.5	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5
ND8751-16	7.5	10.0	9.5	7.5	10.0	10.0	10.0	7.0	7.0	9.5	9.5	9.5
ND8850-2	8.5	9.0	9.0	9.5	10.0	10.0	10.0	6.5	6.5	9.5	9.5	8.5
ND8891-3	8.0	10.0	10.0	9.0	9.0	9.0	9.0	8.0	8.0	10.0	10.0	9.5
ND9516-4R	9.5	9.0	9.0	9.0	9.0	9.0	9.5	6.5	6.5	9.5	9.5	9.0

^{1/} Severe Sloughing - 1; No Sloughing - 10
^{2/} Not Mealy - 1; Very Dry and Mealy - 10
^{3/} Dark - 1; Very White - 10
^{4/} Dark - 1; Very White - 10
^{5/} Poor Flavor - 1; Excellent Flavor - 10

OHIO

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Potato Cultivar Trials, 1979

Over 50 potato varieties and advanced selections were evaluated in trials across Ohio in 1979 (See Appendix Table A1). These trials included: 1) a Statewide Trial of 7 entries located on 6 commercial farms, 2) an Observational Trial of 21 newer entries located on two of the 6 commercial farms, 3) a trial of 9 entries at the OARDC Muck Crops Branch at Celeryville, 4) an evaluation of 17 entries on the North Central Regional Potato Trials located at the OARDC campus at Wooster, and 5) a trial of several russet varieties located at the OARDC campus at Wooster.

The purpose is to test new varieties for the benefit of Ohio growers under various farm conditions. Cultural and pest control practices in each case are those used by the cooperating grower. Stand, vigor and plant characteristics of disease were recorded in the fields. At harvest the tubers were evaluated, weighed and graded, with samples taken for chipping tests.

The work was sponsored by the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University in cooperation with the Ohio Potato Growers Association and commercial growers.

Seven selections were planted in four replicates on each of the six farms. On two of the six farms 21 other lots were tested in small triplicated plots on both farms to find promising new selections for the main study next year. Five of the seven main varieties were also tested on muck soil at Celeryville. These results will also be included in the final report.

Planting dates for the main study varied from May 2 to June 7, with delays due to the wet spring. Katahdin and Norchip were used as standard varieties for comparison. Rainfall was adequate throughout the growing season with no usual prolonged dry periods. It was excessive at some times and places. On farms one and three about six inches fell with hurricane Frederick, and with no period to dry the soil after the heavy rain, much tuber rot was found in slightly lower spots in apparently level fields.

Results of the North Central Trials at Wooster will be given in the North Central Trial report. Table five gives the results of the Muck trials at Celeryville research farm where two entries were added to the seven selections on the six cooperating farms. Table six gives the results of the russet plot.

Nd 8891-3 gave the highest average yield of U.S. No. 1 potatoes on three of the six farms and led in the average of the six farms. Atlantic had the top yield on two of the farms and was second in the six farm average. Michibonne, W 718 and Michimac followed in the average with practically equal yields. Norchip was lowest on five farms and in the average. Katahdin was second lowest on four farms and in the average.

Katahdin, W 718 and Norchip seemed to lack the usual vigor in several cases. The above selections which were in the 1978 trials responded similarly last year.

In the smaller so-called observation trials of 21 entries on the two Columbiana County farms, NY 59 led in average yield as it did in 1978 (second high in 1977). CA 02-7 was second with Kennebec third. Neb. A 129.69-1, which was second high in 1978, Denali and Shurchip followed in that order.

W 718 led in yield with 269 cwt/A of U.S. No. 1 potatoes in the Celeryville muck trials. It has led in yield at Celeryville for four years in a row. Hollow heart may be a problem in this variety on Muck. Michibonne was second in yield with 261 cwt/A of U.S. No. 1 potatoes. It had a good grade, 95% U.S. No. 1 potatoes, and does not have a hollow heart problem. Michimac had a yield of 219 cwt/A of U.S. No. 1 potatoes this year--it yielded well in 1978. Atlantic has internal tuber problems, ND 8891-3 does not yield well on muck, and NDA 8694-3 and Bel Rus are russets that do not yield well on muck.

A 67678-1 was the highest yielding variety in the russet trial, but tubers were rather rough and would not be suitable for fresh market. B 7516-9 yielded well and is an attractive, round white potato. Tubers were actually too large but there was no hollow heart detected in the tubers cut. B 7583-6 yielded well and is an attractive, round russet potato. It did not show any internal tuber problems in 1979. B 8822-29 and B 8972-1 were rough russets and did not yield well. B 8822-9 and B 8392-5 had internal tuber defects. Butte yielded very poorly and did not have good tuber shape.

OHIO TABLE 1. Average U.S. No. 1 yields, grades, tuber weights, and stands.
Statewide Trials

Entry	Yield cwt/A	Listed in order of average yield Percent			Tuber Wt (oz.)	Percent stand
		U.S. No. 1	B Size	Culls		
ND8891-3	425	85.7	3.8	10.8	6.5	88
Atlantic	414	92.5	3.4	4.2	6.4	89
Michibonne	391	90.6	2.2	7.6	8.4	91
W 718	386	91.3	3.6	5.4	6.6	84
Michimac	384	89.9	4.2	6.0	6.1	95
Katahdin	346	90.4	4.4	5.8	6.0	89
Norchip	309	83.3	7.2	9.6	5.1	92
Average	379	89.1	4.2	7.0	6.4	90

OHIO TABLE 2. Yield U.S. No. 1 tubers in cwt/A for each farm. Statewide Trials.
(Rank of yield on each farm in parenthesis)

Farm	B	TH	M	G	C	TR	Average
ND8891-3	385(2)	458(1)	520(1)	292(2)	504(1)	392(3)	425
Atlantic	373(4)	396(3)	498(2)	366(1)	451(5)	398(1)	414
Michibonne	356(5)	427(2)	391(6)	280(3)	499(2)	394(2)	391
W 718	431(1)	379(5)	419(5)	229(4)	494(3)	365(5)	386
Michimac	385(3)	381(4)	451(3)	206(5)	492(4)	388(4)	384
Katahdin	324(6)	354(6)	437(4)	189(7)	404(6)	365(6)	346
Norchip	290(7)	302(7)	358(7)	204(6)	361(7)	341(7)	309
Average	363	385	438	252	458	378	

OHIO TABLE 3. Yield, grade, and tuber size of Observation Entries.

Entry	Yield (cwt/A)	% U.S. No.1	Tuber Weight (oz.)
NY 59	457	90.7	8.0
CA 02-7	431	94.0	6.5
Kennebec	399	89.8	8.1
NEB A 129.69-1	398	95.6	6.4
Denali	397	92.3	6.4
Shurchip	374	88.0	5.4
Dakchip	364	91.4	6.0
NEB. 63.71-1	342	87.2	6.9
MS 004-169	342	89.2	5.4
NEB. 2.67-1	324	91.8	4.9
B 7583-6	324	90.0	6.6
Superior	323	90.1	4.8
Jemseg	309	85.6	7.6
B 6969-2	302	92.5	6.2
NDA 8694-3	290	91.1	6.6
Monona	288	93.4	6.6
B 7845-4	286	81.6	5.6
Butte	276	75.5	5.0
NEB. 74-1	255	78.6	4.9
AK 13-5	255	80.6	6.0
Belrus	240	84.4	5.1
Average	337	88.6	6.2

OHIO TABLE 4. Summary of percent hollow heart and internal necrosis of tubers cut - Observation Trial.

Hollow Heart	%	Necrosis	%
B 7845-4	10	NY 59	16
Monona	5	Monona	7
AK 13-5	4	Neb. A129.69-1	6
MS 004-169	4	CA 02-7	4
CA 02-7	4	B7845-4	2.5
Shurchip	2.5		

OHIO TABLE 5. Yield and grade characteristics of entries in Celeryville Muck Trial.

Entry	Yield (cwt.)		Percent			
	Total	U.S. #1	US #1	B-size	Culls	HH ¹
W 718	285	269	94.3	4.2	1.5	20
Michibonne	276	261	95.0	2.5	2.5	4
Atlantic	264	236	88.6	6.4	5.0	52
Katahdin	259	233	90.4	5.4	4.2	8
Michimac	240	219	91.1	6.0	2.9	24
NDA 8694-3	237	206	86.8	5.4	7.8	0
ND 8891-3	244	205	84.3	7.5	8.2	12
Superior	197	175	88.9	5.7	5.4	0
Bel Rus	176	143	80.5	18.5	1.0	0

1) % of tubers with hollow heart of 5 large tubers cut in each of 5 replicates.

OHIO TABLE 6. Yield, grade, and internal defects of russet plot entries.

Entry	Skin	U.S. No. 1 (cwt.)	% B	% Culls	% HH ¹	Int. Nec.%
A67678-1	Rus.	350.4	4.9	24.5	10	
B 7583-6	Rus.	348.6	4.1	11.9		
B 7516-9	Wh.	330.0	4.8	17.0		
B 8392-5	Wh.	288.0	2.8	21.2	7.5	7.5
B 8822-9	Rus.	284.6	6.2	18.7	10	15
Butte	Rus.	213.6	10.8	38.3	2.5	
B 8972-1	Rus.	208.9	6.8	19.1		
B 8822-29	Rus.	196.6	5.3	34.4		

1) % hollow heart and internal necrosis of ten large tubers cut out of each replicate.

SOUTH CAROLINA

Wayne R. Sitterly

Irish Potato Variety Evaluation, 1979

Purpose. To obtain Irish potato varieties adaptable to coastal South Carolina.

Procedure. On Feb. 26 a field of fine sandy loam was fertilized with 1200 lbs./A of granular 5-10-10. Seed pieces of specific varieties were planted. Replicated trials utilized a randomized block design of four replicates and individual plots of 1/250 A. After planting, Entam was applied to a 12" band at the rate of two lbs/A and the area was then bedded. At emergence the area was fertilized with 200 lbs/A of granular 10-10-10 and re-bedded. At last cultivation the area received 200 lbs/A of granular 10-10-10 and 30 lbs. nitrogen/A. Recommended pesticides were applied as needed.

Results. The growing season was cold and wet. Harvesting was done June 4, 1979.

I. Replicated Yield

As shown in South Carolina Table 1, B6987-29, B7139-4, Croatan and B8392-5 were early maturing.

The highest yields were produced by B7139-4, B7516-7, B6987-184 and B8392-5.

The most total solids were produced by B7516-7, B7139-4, B6969-2 and Croatan.

Tuber internal browning was exhibited by B6987-184, B7516-9, Croatan and B8392-5.

Tuber size was good for about every entry in this test.

II. Observational Yield

Maturity and size were adequate for all entries. Yields and total solids were low for all entries.

Tuber internal browning was exhibited by B8907-4 and B8101.

Conclusions. The best performing entry in the replicated yield trial was B7139-4, followed by B7516-7. No observational entry was worthy of advancement to replicated trial.

South Carolina Table 1. Performance of selected Irish potato varieties, 1979.

Variety	Matur- ity	Shape	Yield (Cwt/A)	DM (%)	Internal browning (%)	Size
<u>Replicated</u>						
B6987-29	E	Oval-elong.	121	16.7		M-L
B6987-184	ML	Oval-elong.	171	16.3	10	M-L
B7139-4	E	Elongate	177	20.9		L
B7516-7	M	Oval	177	21.0		L
B7516-9	M	Oval	132	19.7	10	L
B7802-2	ML	Oval	156	16.2		L
B8477-4	M	Oval	135	14.7		M-L
B6969-2	M	Elongate	156	20.4		M
Atlantic	ML	Oval	159	19.4		M
Croatan	E	Oval	162	20.1	40	L
B8392-5	E	Oval	165	17.4	20	L
B7839-7	M	Oval	139	18.0		M
<u>Observational</u>						
B8621-3	M	Oval	125	18.0		M
B8907-4	M	Oval	129	19.7	70	L
B8497-35	M	Oval-elong.	84	16.0		M
B8101	M	Oval	123	18.0	30	L

TEXAS

J. Creighton Miller, Jr. and Douglas G. Smallwood

Variety Development and Testing

Seedling Program. Approximately 49,000 first year seedlings, representing 318 families, were grown for selection near Hereford in 1979, and 731 original selections were made from this material. Approximately one third (18,195) of the 1979 first year seedlings resulted from crosses made at the Texas Agricultural Experiment Station near Lubbock, during the winter of 1977-78. The remainder were obtained from Joe Pavek in Idaho (14,941), Bob Johansen in North Dakota (13,046), and Florian Lauer in Minnesota (3,000). The Texas program also supplied the North Dakota, Idaho and Colorado programs with second, third and fourth sized seedling tubers for selection.

Adaptation Trials. Some 595 entries were grown in replicated and nonreplicated trials at two locations in West Texas. This provided for testing both on sandy soil with center pivot irrigation (Olton) and on clay or tight soil (Hereford) where the furrow irrigation method is used. Not all entries were included at each locale. Selected trials are included in this report.

The variety and advanced selection trial at Hereford (Table 1) was planted April 3 and harvested on August 7, with a similar trial planted on the Olton sand on March 24 and harvested July 23 (Table 2). A 68678-1 (Lemhi Russet) performed quite well in Texas this year. The check variety Red LaSoda continues to produce very high yields, and outyielded Dark Red LaSoda and Red LaSoda #5. The Norgold Russet strains continue to cause some confusion among the growers, because several of them display a somewhat erratic performance from year to year. There is no question that they differ substantially from regular Norgold Russet in plant vigor, maturity and other characteristics. The most consistent performer from year to year has been Norgold "M". This year, several of the strains outperformed regular Norgold Russet. This generally occurs on years when conditions are not conducive to good plant top growth.

The strain question was addressed in an additional trial (Table 3) in cooperation with Warren Trank in Nebraska. The seed for all entries was grown in the same field in Nebraska, harvested at the same time and stored in the same storage. In the spring it was all removed from storage, cut, and shipped to Texas. The idea was to use seed which was all in the same physiological condition. To provide continuity from trial to trial in Texas, two check entries were added. They were the first Red LaSoda and the second Norgold Russet listed in Table 3. In general, Norgold Russet strains again outyielded Regular Norgold Russet. Because of the way the study was set up, place effect can probably be ruled out as a contributor to the observed strain differences. Sharon Desborough at the University of Minnesota has run both acid and basic gels for soluble proteins on several of the strains and regular Norgold Russet. No differences in banding patterns were observed.

We have a number of selections which show promise, as can be seen in Table 4. This trial was grown from Texas seed. Several selections, including TX 458-1 Ru, TX 458-2 Ru, MnTX 57-1 Ru, TXND 14-1 Ru, and TX Late Norgold, are being increased by a North Dakota seed grower.

Texas Table 1. Total yield, percent of tubers over 4 ounces, average weight per tuber, specific gravity, vigor, maturity, and general rating of 49 potato varieties or selections grown at Hereford, Texas-1979.

Variety or Selection	Total Yield CWT/A	Percent of Tubers over 4 oz.	Average Weight/ Tuber in oz.	Specific Gravity	Vigor ^{1/}	Maturity ^{2/}	General Rating ^{3/}
A 71.72-1	605.8	62.0	8.4	1.085	3.2	3.8	3.7
Red LaSoda	594.2	79.0	9.6	1.077	3.9	3.0	3.3
Norgold "7"	552.6	66.4	8.2	1.067	3.6	3.7	4.1
New Haig	536.7	73.1	7.5	1.070	3.1	2.9	3.7
Belchip	521.0	80.3	9.8	1.078	3.3	2.4	4.0
Neb 42-1	515.8	69.8	6.8	1.074	3.7	2.9	3.7
Norgold "M"	503.6	65.2	7.9	1.071	3.3	3.3	4.0
A 68678-1	498.0	71.3	7.5	1.092	4.0	2.4	3.9
NDA 8694-3	486.1	72.0	7.6	1.079	3.6	3.7	3.5
TXND 22-2 W	486.1	73.7	6.2	1.085	3.3	3.0	3.4
Minn 8757	485.8	77.5	8.6	1.070	3.7	3.8	3.5
Minn 8832	481.8	61.7	6.3	1.075	3.3	3.3	3.6
Norgold "L"	481.5	68.0	7.0	1.067	3.8	3.7	4.0
Neb 498	478.9	61.5	5.7	1.079	3.9	3.0	3.8
New Superior	478.9	69.3	7.6	1.071	3.3	2.9	3.7
Atlantic	477.7	71.6	7.9	1.085	3.7	3.3	3.3
Minn 9366	474.8	55.0	4.9	1.078	3.5	3.6	3.5
Minn 9234	474.5	50.7	4.3	1.078	3.7	2.2	3.0
A 67560	471.6	61.9	6.1	1.066	3.5	3.1	3.5
A 69.72-1	464.1	73.2	7.6	1.082	3.3	2.9	3.7
Red LaSoda #5	456.8	78.3	9.0	1.061	3.5	3.6	3.7
Dark Red LaSoda	454.2	76.7	8.9	1.068	3.2	3.5	3.6
Norgold "5"	449.0	63.4	5.7	1.070	3.3	3.4	3.8
Minn 4536	444.6	72.0	6.8	1.070	3.5	3.9	3.6
Minn 8743	440.2	66.5	6.4	1.071	3.3	3.6	2.9

Continued

Texas Table 1. Continued

Norgold "19"	422.5	64.4	1.070
Minn 9319	408.6	71.9	5.8
Norgold "15"	408.0	53.2	3.0
Butte	405.1	41.1	3.5
Minn 8751	400.8	77.8	2.8
ALR 22-2	391.8	59.7	3.0
Norgold "10"	390.8	51.3	3.6
Norgold "35"	390.3	68.0	3.0
Norgold Russet	383.0	59.5	3.6
ND 217-4 Ru	377.5	45.6	3.6
Minn 8755	359.8	60.2	3.3
NDTX 344-1 R	354.6	57.9	3.2
NDTX 177-4 W	349.1	79.8	3.8
WN 541-2	332.2	66.3	3.3
Minn 7973	325.8	62.1	3.3
NDTX 9522-1 R	318.3	62.8	3.5
Minn 9648	312.2	60.0	3.5
Minn 8586	307.2	24.3	3.2
Minn 9650	292.4	49.3	3.2
BeiRuss	275.0	56.1	3.2
NDTX 177-3 W	238.4	53.4	3.0
NDTX 9523-1 R	234.4	66.9	3.1
NDTX 944-3 Ru	166.4	54.9	3.0
NDTX 9518-1 Ru	93.5	24.6	3.0
Average	413.3	63.1	3.5
L.S.D. (.05)	81.2	11.9	3.5
		1.4	3.5
			3.5

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous
 2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early
 3/ 1 = very poor to 5 = excellent

Texas Table 2. Total yield, percent of tubers over 4 ounces, average weight per tuber, specific gravity, vigor, maturity and general rating for 49 potato varieties or selections grown at 01ton, Texas-1979.

Variety or Selection	Total Yield CWT/A	Percent of Tubers over 4 oz.	Average Weight/ Tuber in oz.	Specific Gravity	Vigor _{1/}	Maturity _{3/}	General Rating _{3/}
Red LaSoda	507.0	77.2	7.8	1.056	4.0	3.2	3.4
New Haig	429.2	71.6	5.7	1.057	3.6	3.3	3.1
Norgold "M"	391.8	63.8	5.6	1.053	3.3	3.8	3.5
A 68678-1	382.5	57.5	6.1	1.068	3.8	2.8	3.6
Atlantic	376.7	66.6	5.3	1.078	3.5	3.3	3.1
NDA 8694-3	376.4	67.6	5.8	1.054	3.3	3.8	3.0
A 69.72-1	369.7	67.7	6.6	1.056	3.2	3.5	3.5
Minn 8757	362.7	67.3	5.8	1.052	3.3	4.0	3.1
A 71.72-1	358.6	62.3	5.6	1.068	3.5	4.2	3.2
TXND 22-2 W	356.9	46.5	4.6	1.067	3.3	4.1	2.6
New Superior	344.1	70.6	6.6	1.056	3.3	3.6	3.0
Minn 8743	344.2	44.3	4.0	1.049	3.3	4.1	2.7
Belchip	336.6	66.1	6.1	1.067	3.6	2.4	3.3
Dark Red LaSoda	336.6	59.0	5.3	1.047	3.1	3.8	3.4
Norgold "L"	325.8	60.2	5.4	1.053	3.2	4.0	3.3
Neb 42-1	324.7	42.6	4.3	1.059	3.7	3.8	3.3
A 67560	320.6	57.7	4.5	1.056	3.0	3.7	3.2
Minn 9234	316.3	39.3	3.7	1.069	3.6	2.5	3.0
Red LaSoda #5	316.3	65.7	5.2	1.051	3.4	4.1	3.1
Minn 8755	310.4	44.5	4.3	1.062	3.3	3.7	3.0
Norgold "35"	307.5	59.9	5.2	1.057	3.7	3.0	3.3
Butte	305.8	40.3	4.3	1.072	3.3	2.7	3.0
Norgold "19"	305.8	58.7	4.8	1.057	3.5	3.8	3.2
Norgold "5"	305.2	57.6	4.8	1.056	3.3	3.9	3.2
Norgold "7"	304.9	53.6	5.0	1.056	4.3	3.2	3.5

Continued

Texas Table 2: Continued

Minn 9319	291.3	52.9	4.9	1.060	3.0
Neb 498	287.8	43.0	4.4	1.057	3.0
Minn 9366	281.4	44.6	4.0	1.066	2.7
ND 217-4 Ru	276.2	38.7	4.5	1.061	3.0
Norgold "15"	275.6	40.3	4.1	1.054	3.0
Norgold "10"	274.6	57.5	5.0	1.056	3.1
Minn 4536	272.1	48.8	4.6	1.063	4.5
Minn 8751	268.0	36.3	3.4	1.062	4.5
NDTX 9522-1 R	266.3	55.0	4.4	1.051	2.4
Minn 8832	265.4	54.2	4.9	1.061	2.7
NDTX 344-1 R	253.2	38.9	4.1	1.057	3.8
ALR 22-2	251.7	71.6	5.5	1.064	3.1
Norgold Russet	249.7	48.7	4.3	1.058	3.0
NDTX 177-3 W	249.2	70.9	5.5	1.058	2.6
NDTX 177-4 W	242.8	73.9	6.4	1.054	3.1
WN 541-2	242.5	58.1	5.0	1.055	2.4
Minn 7973	215.5	59.2	5.7	1.059	3.0
Minn 9650	192.0	25.8	3.5	1.065	2.5
BelRuss	186.4	39.2	4.2	1.067	2.7
Minn 8586	174.2	28.5	3.4	1.056	3.0
Minn 9648	166.7	44.1	4.0	1.059	2.5
NDTX 9518-1 Ru	123.1	41.8	3.9	1.055	2.7
NDTX 944-3 Ru	84.8	51.0	4.7	1.057	3.8
NDTX 9523-1 R	59.0	80.8	5.4	1.044	4.3
Average	289.1	54.5	4.9	1.059	3.1
L.S.D. (.05)	74.7	14.8	1.1	3.8	3.0

1/1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous
 2/1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

Texas Table 3. Total yield, percent of tubers over 4 ounces, average weight per tuber, specific gravity, vigor, maturity, and general rating of 13 strains and 5 named varieties of potatoes grown at Hereford, Texas-1979.

Selection of Check Variety	Total Yield CWT/A	Percent of Tubers over 4 oz.	Specific Gravity	Vigor ^{1/}	Maturity ^{2/}	General ^{3/} Rating
Red LaSoda	590.7	81.1	1.079	3.7	3.3	4.0
Red LaSoda #10	577.6	83.8	1.070	3.0	3.8	3.9
Red LaSoda	556.3	82.0	1.080	3.5	3.3	3.4
Norgold "35"	548.9	76.1	1.075	3.5	3.5	4.0
Norgold "M"	488.7	69.6	1.081	3.5	3.5	3.1
Haig	473.9	81.2	1.074	2.9	3.7	3.5
Norgold "7"	472.6	70.3	1.071	3.8	3.3	3.8
New Superior	461.7	83.0	1.075	3.3	2.8	3.8
Norgold "L"	458.7	73.9	1.073	3.0	4.0	3.7
Norgold "H"	439.1	67.5	1.081	3.5	3.7	3.9
Superior	428.6	82.4	1.079	3.3	3.8	3.7
Norgold "10"	422.5	68.6	1.076	2.9	4.3	3.3
New Haig	422.1	85.7	1.085	2.9	3.5	3.5
Red LaSoda #5	422.1	82.1	1.068	3.0	3.5	3.8
Norgold Russet	416.9	75.2	1.075	2.7	4.3	3.5
A 68678-1	410.8	65.4	1.082	3.4	3.8	3.3
Norgold Russet	370.7	73.7	1.079	3.0	3.8	3.3
Dark Red Norland	355.0	84.0	1.078	2.3	4.0	3.2
Norland	344.1	82.5	1.071	2.5	4.3	3.3
Norgold "19"	252.2	75.7	1.073	3.0	4.3	3.7
Average	445.7	77.2	1.076	3.1	3.7	3.6
L.S.D. (.05)	114.0	13.0				

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = Vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

Texas Table 4. Total yield, percent tubers in 2 size grades, average weight per tuber, specific gravity, vigor, maturity, and general rating of 92 North Dakota-Texas, Minnesota-Texas and Texas advanced selections and 2 check varieties of potatoes grown at Hereford, Texas-1979.

Variety or Selection	Total Yield CWT/A	Percent Tubers by Number		Average Weight/ Tuber in oz.	Specific Gravity	Vigor ^{1/}	Maturity ^{2/}	General ^{3/} Rating
		Under 2 in.	Over 2 in.					
MnTX 3-1 Ru	864.2	56.3	43.7	5.9	1.069	2.8	3.9	3.5
MnTX 7-2 W	831.1	45.7	54.3	8.7	1.075	3.2	3.3	3.2
NDTX 579-1 Ru	761.4	63.4	36.6	6.4	1.059	3.0	2.5	2.7
TX 375-3 Ru	738.8	48.5	51.5	7.7	1.073	3.5	3.3	3.5
NDTX 441-1 W	629.0	63.9	36.1	4.5	1.084	3.3	3.3	2.7
TX 281-1 Ru	609.8	29.6	70.4	10.4	1.095	3.3	3.3	2.9
TX 281-4 Ru	608.1	34.9	65.1	9.3	1.083	3.0	3.3	2.9
TX 303-1 Ru	601.1	39.4	60.6	9.0	1.071	3.3	2.8	2.7
TX 250-1 Ru	568.0	43.9	56.1	8.5	1.059	3.0	2.5	2.7
NDTX 537-2 Ru	566.3	60.9	39.1	5.7	1.058	3.2	4.0	2.8
TX 281-7 Ru	550.6	72.7	27.3	4.6	1.085	2.8	3.8	2.8
MnTX 1-1 Ru	538.4	68.4	31.6	6.0	1.078	2.8	3.3	3.3
NDTX 455-1 Ru	522.7	71.1	28.9	6.0	1.080	3.3	3.3	2.9
TX 330-1 Ru	521.0	30.8	69.2	8.5	1.078	2.7	3.3	3.0
TX 294-1 Ru	486.1	68.2	31.8	4.6	1.084	2.9	3.5	2.9
TX 239-2 Ru	480.9	81.7	18.3	3.9	1.072	2.4	2.9	2.5
TX 336-10 Ru	479.2	73.2	26.8	5.4	1.080	3.2	4.5	2.7
TX 351-5 Ru	475.7	51.3	48.7	6.0	1.068	3.3	3.9	3.5
TX 336-6 Ru	473.9	52.9	47.1	6.4	1.083	3.3	2.3	3.5
MnTX 32-1 R	467.0	68.6	31.4	4.9	1.085	3.0	4.0	2.0
NDTX 422-2 Ru	461.7	59.8	40.2	6.1	1.069	2.9	3.8	3.3
TX 336-11 Ru	460.0	58.2	41.8	6.3	1.082	3.5	3.3	3.0
NDTX 550-2 Ru	460.0	50.9	49.1	6.7	1.065	2.5	3.0	3.3
Red LaSoda	454.8	52.6	47.4	5.4	1.067	3.8	2.8	3.1
MnTX 27-1 W	453.0	53.9	46.1	8.0	1.063	2.8	3.0	2.8

Continued

Texas Table 4. Continued

NDTX 557-1 Ru	449.5	65.7	5.2	3.0
MnTX 4-10 Ru	446.1	43.6	6.1	2.7
TX 329-7 Ru	440.8	58.0	6.5	2.3
NDTX 554-2 Ru	440.8	56.9	5.6	3.0
TX 151-1 Ru	435.6	81.6	18.4	2.5
TX 294-2 Ru	425.2	57.9	42.1	3.3
TX 341-4 Ru	418.2	61.4	38.6	2.8
TX 148-1 Ru	414.7	65.3	34.7	2.7
TX 265-1 Ru	414.7	80.0	20.0	2.0
TX 153-1 Ru	400.8	80.4	19.6	2.5
TX 281-8 Ru	400.8	81.4	18.6	2.8
TX 336-13 Ru	400.8	61.3	38.7	2.7
TX 332-1 Ru	393.8	66.7	33.3	2.8
TX 157-1 Ru	388.6	31.7	68.3	6.9
TX 291-4 Ru	386.8	78.2	21.8	4.1
NDTX 534-6 Ru	379.8	60.7	39.3	6.1
MnTX 1-2 Ru	369.4	70.8	29.2	5.1
TX 336-3 Ru	369.4	72.8	27.1	4.6
NDTX 446-2 Ru	364.2	87.5	12.5	3.4
TX 336-21 Ru	360.7	33.1	66.9	8.9
TX 315-5 Ru	358.9	76.2	23.8	4.7
TX 336-2 Ru	357.2	32.5	67.5	9.5
NDTX 492-1 Ru	350.2	70.1	29.9	5.2
TX 351-6 Ru	346.7	54.0	46.0	7.0
TX 336-9 Ru	343.3	40.6	59.4	7.2
MnTX 4-6 Ru	341.5	70.9	29.1	4.0
TX 336-12 Ru	341.5	58.4	41.6	5.9
TX 336-29 Ru	339.8	67.1	32.9	5.3
TX 153-2 Ru	334.5	55.2	44.8	5.3
Norgold Russet	331.1	45.2	54.8	7.1
		1.076	2.9	4.0
		1.082	2.9	4.0
		1.071	2.9	4.0
		1.076	2.5	3.0
		1.069	2.0	2.5
		1.068	2.8	3.0
		1.069	2.8	3.0
		1.078	2.5	3.0
		1.083	2.8	3.5
		1.089	2.8	3.5
		1.086	3.0	3.0
		1.070	2.9	3.4
		1.068	2.9	3.5
		1.070	2.8	3.0
		1.062	2.4	2.4
		1.081	2.4	3.3
		1.084	3.2	4.0
		1.070	2.8	3.8
		1.080	2.8	2.5
		1.077	2.7	3.3
		1.084	3.3	3.7
		1.079	2.8	4.0
		1.077	3.2	2.7
		1.080	2.8	3.9
		1.071	2.9	3.0
		1.075	2.9	3.5
		1.062	2.4	3.5
		1.070	2.9	4.0
		1.091	2.9	4.3
		1.066	2.8	2.5
		1.076	2.9	4.0

Continued

Texas Table 4. Continued

MnTX 4-4 Ru	325.8	1.053
TX 174-4 Ru	325.8	2.6
TX 336-25 Ru	322.3	4.6
TX 281-13 Ru	317.1	3.8
TX 336-20 Ru	310.2	5.1
TX 336-12b Ru	306.7	63.2
TX 336-26 Ru	306.7	67.5
TX 243-4 Ru	298.0	62.1
TX 329-3 Ru	292.7	56.0
MnTX 4-2 Ru	282.3	51.2
TX 243-5 Ru	282.3	89.4
TX 276-3 Ru	282.3	73.3
NDTX 645-1 R	282.3	88.2
MnTX 56-1 Ru	280.5	54.4
NDTX 409-2 Ru	280.5	37.7
MnTX 40-1 Ru	275.3	54.2
TX 298-1 Ru	275.3	60.7
TX 146-5 Ru	275.3	77.0
TX 351-7 Ru	270.1	86.4
TX 336-31 Ru	256.1	78.4
TX 336-22 Ru	245.7	64.6
NDTX 482-8 Ru	243.9	50.8
TX 289-3 Ru	242.2	64.8
TX 329-5 Ru	242.2	84.0
TX 336-30 Ru	209.1	66.3
TX 255-1 Ru	191.7	88.5
TX 298-6 Ru	191.7	87.5
TX 146-4 Ru	189.9	73.9
TX 261-2 Ru	184.7	88.5
TX 169-2 Ru	183.0	78.8
		21.2
		21.5
		2.9
		2.0
		1.5
		1.0
		0.8
		0.7
		0.6
		0.5
		0.4
		0.3
		0.2
		0.1
		0.0

Continued

Texas Table 4. Continued

TX 146-3 Ru	181.2	88.7	11.3	3.3	1.056	1.5	3.5
TX 289-1 Ru	181.2	100.0	0.0	3.3	1.080	1.9	4.0
TX 198-1 Ru	176.0	76.7	23.3	4.7	1.056	1.5	2.3
TX 168-2 Ru	128.0	100.0	0.0	3.5	1.056	1.0	2.0
TX 255-2 Ru	127.2	93.8	7.2	2.9	1.061	1.0	2.0
NDTX 500-1 R	116.7	80.8	19.2	4.7	1.069	1.8	2.9
TX 330-5 Ru	115.0	100.0	0.0	3.8	1.069	1.0	2.7
TX 190-1 Ru	113.3	100.0	0.0	2.9	1.065	1.4	4.0
TX 329-2 Ru	94.1	100.0	0.0	2.4	1.069	3.0	2.0
Average L.S.D. (.05)	361.8 139.0	66.5 21.6	33.5 21.6	5.4 1.9	1.074	2.5	3.4
							2.7

1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

VERMONT

By S. C. Wiggans, R. N. Jensen, H. J. Murphy

During 1979, four variety trials were conducted in Vermont by the Plant and Soil Science Department of the University of Vermont, the Plant Industry Division of the Vermont Department of Agriculture, and the Plant and Soil Sciences Department of the University of Maine. Two trials were located in South Burlington, and one each in Brandon and Elmore, Vermont. There were five replicates in a randomized block design at each location. Seedpieces of all varieties were planted by hand. Seedpiece spacing was 9 inches apart, except Russet Burbank, which was planted 16 inches apart. These trials were part of the NE-107, Cooperative Northeast Region Potato Variety Trials, conducted in cooperation with the National Potato Breeding Program.

The plot of earlier maturing varieties at South Burlington was planted May 22, and harvested October 3 and 4, 1979 (Table 1). The plot of later maturing varieties at South Burlington was planted May 22, and harvested October 3 and 4, 1979 (Table 2). Fertilizer was broadcast at 133-265-265 per acre and disked-in prior to planting. Potatoes were grown in a light, sandy soil. Weed control was good. The season was very dry. Irrigation was applied as needed.

The plots at Elmore were planted May 15, killed September 8, and harvested September 21, 1979 (Table 3). Fertilizer was applied in the furrow at a rate of 120-180-180 per acre. Potatoes were grown in a medium, loamy soil. Weed control was fair. The season was very dry. No supplementary irrigation was applied.

The plot at Brandon was planted May 18, killed August 30, and harvested September 20, 1979 (Table 4). Fertilizer was applied in the furrow at the rate of 160-240-240 per acre. Potatoes were grown in a very light, very sandy soil. Weed control was good. The weather was very dry during the growing season. They were irrigated as needed.

Chip color indices for potato varieties at the three locations are given in Table 5.

The four highest yielding varieties in the early, medium early, and medium maturing plot at South Burlington were CC26-1A Atlantic, W718, and Kennebec. The four highest yielding varieties in the medium late, late, and very late maturing plot at South Burlington were Hudson, Green Mountain, BR 7093-23, and Belchip. The highest yielding varieties at Elmore were Kennebec, W564-3A, W718, and Russet Burbank. The six highest yielding varieties at Brandon were W718, BR7093-23, Jemseg, AF205-9, B7802-2, and Kennebec. Kennebec and W718 were high yielding varieties at South Burlington, Elmore and Brandon.

Table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 15 early, medium early, and medium maturing potato varieties grown at Burlington, Vermont - 1979.

Variety ¹	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/2 to 4 inches	Specific gravity	Percentage total solids
Alaska Red	212	80.1	25.0	1.070	18.10
Atlantic	350	96.8	81.2	1.077	19.58
Bake King	284	94.9	54.5	1.074	18.95
Batoche	271	94.1	55.2	1.064	16.84
Bison	263	89.6	41.6	1.060	15.99
Campbell 13	203	95.2	69.9	1.062	16.42
Cobbler	251	94.7	59.8	1.066	17.26
Croatan	222	89.4	39.9	1.058	15.57
Kennebec	320	97.3	72.2	1.066	17.26
Superior	259	96.6	67.7	1.063	16.63
B6503-2	208	94.4	58.3	1.066	17.26
B6969-2	267	96.7	74.8	1.063	16.63
CC26-1A	361	96.3	75.6	1.073	18.74
W564-3A	253	88.1	30.5	1.055	14.94
W718	321	91.4	71.0	1.063	16.63
Bayes L.S.D. (0.05)	136			0.003	

¹Planted - May 22; killed - frost; harvested - October 3 and 4, 1979.

Seedpieces of all varieties spaced 9 inches apart.

Fertilization: 133-265-265.

Table 2 Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 22 medium late, late, and very late maturing varieties grown at Burlington, Vermont - 1979.

Variety ¹	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches		Percentage of yield 2-1/2 to 4 inches	Specific gravity	Percentage total solids
		97.3	81.5			
Belchip	303	96.8	71.2	1.070	18.10	
Belleisle	293	80.8	23.2	1.079	20.00	
Belrus	150	96.7	69.8	1.069	17.89	
Buckskin	256	97.3	81.8	1.071	18.32	
Campbell 11	196	92.6	51.9	1.076	19.37	
Campbell 12	222	81.0	25.8	1.066	17.26	
Centennial Russet	182	96.8	64.0	1.071	18.32	
Green Mountain	314	97.6	86.8	1.075	19.16	
Hudson	346	95.5	75.0	1.072	18.53	
Katahdin	298	74.6	22.1	1.071	18.32	
Russet Burbank	211	93.0	54.9	1.073	18.74	
Snowchip	259	92.5	47.0	1.063	16.63	
AF186-2	258	95.9	67.8	1.079	20.00	
AF92-3	247	98.8	82.7	1.055	14.94	
B6987-184	280	96.4	65.1	1.085	21.27	
B7583-6	292	97.3	74.0	1.078	19.79	
BR7088-18	279	95.6	66.2	1.076	19.37	
BR7090-17	222	96.9	78.4	1.065	17.05	
BR7093-23	312	96.0	69.4	1.069	17.89	
C72107-13A	277	97.7	75.1	1.066	17.26	
CA02-7	260	97.0	76.3	1.068	17.68	
CD106-16	230			1.072	18.53	
Bayes L.S.D. (0.05)	48			0.002		

¹Planted - May 22; killed - frost (1 week prior to harvest); harvested - October 3 and 4, 1979.

Seedpieces of all varieties spaced 9 inches apart. Fertilization: 133-265-265.

Table 3 Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 20 potato varieties grown at Elmore, Vermont - 1979.

Variety ¹	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/2 to 4 inches	Specific gravity	Percentage total solids
Cobbler	191	96.3	61.5	1.071	18.32
Croatan	211	97.2	63.7	1.064	16.84
Delta Gold	238	96.6	68.1	1.080	20.21
Jemseg	243	95.8	71.0	1.075	19.16
Katahdin	226	95.6	62.8	1.074	18.95
Kennebec	301	95.8	74.9	1.072	18.53
AF205-9	194	92.5	48.3	1.083	20.85
AK6-5	207	95.3	60.6	1.087	21.69
AK28	189	93.6	54.6	1.076	19.37
B6503-2	163	96.6	53.7	1.082	20.64
B6969-2	216	96.5	65.6	1.070	18.10
B7802-2	209	96.7	67.5	1.072	18.53
BR7088-18	215	94.5	56.0	1.087	21.69
BR7093-23	183	94.7	51.3	1.076	19.37
F69016	261	97.4	70.1	1.075	19.16
W564-3A	298	96.4	61.6	1.072	18.53
W718	298	90.8	69.5	1.067	17.47
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BelRus	191	59.6	1.084	21.06	
Butte	213	60.9	1.078	19.79	
Russet Burbank	283	55.5	1.083	20.85	
Bayes L.S.D. (0.05)	93		0.004		

¹Planted - May 15; killed - September 8; harvested - September 21, 1979.
Seedpieces of all varieties spaced 9 inches apart. Fertilization: 120-180-180.

Table 4 Yield, percentage of yield between 1-7/8 and 4 inches, percent defects, specific gravity, and total solids for 20 potato varieties grown at Brandon, Vermont - 1979.

Variety ¹	Cwt./A.	Usable		Percent- age defects ²	1-7/8 to 4 inches	2-1/2 to 4 inches	Percentage of yield of yield 1-7/8 to 4 inches	Percentage of yield 2-1/2 to 4 inches	Specific gravity	Percentage total solids
		Yield above 1½ inches	yield above 1½ inches							
Cobbler	358	356	0.5	95.3	53.6	1.070	18.10			
Croatan	269	269	0.0	94.8	46.8	1.060	15.99			
Delta Gold	299	299	0.0	97.3	59.9	1.077	19.58			
Jemseg	409	409	0.0	93.5	76.0	1.066	17.26			
Katahdin	346	346	0.0	96.3	58.6	1.068	17.68			
Kennebec	382	381	0.5	96.8	65.4	1.072	18.53			
AF205-9	389	384	1.3	91.9	37.9	1.079	20.00			
AK6-5	236	236	0.0	93.0	29.6	1.076	19.37			
AK28	188	188	0.0	87.5	22.9	1.071	18.32			
B6503-2	273	272	0.3	97.0	63.3	1.077	19.58			
B6969-2	361	361	0.0	97.0	65.7	1.064	16.84			
B7802-2	386	386	0.0	96.8	75.4	1.065	17.05			
BR7088-18	347	304	12.2	97.4	65.1	1.084	21.06			
BR7093-23	433	433	0.0	96.4	55.7	1.073	18.74			
F69016	304	304	0.0	91.2	46.3	1.073	18.74			
W564-3A	369	369	0.0	95.1	49.9	1.064	16.84			
W718	440	440	0.0	94.9	74.6	1.065	17.05			
<u>4-10 ounce size</u>										
BelRus	215	215	0.0	67.8		1.072	18.53			
Butte	283	283	0.0	52.2		1.078	19.79			
Russet Burbank	351	351	0.0	58.2		1.077	19.58			
Bayes L.S.D. (0.05)	75	75				0.004				

Table 4 - continued

¹Planted - May 18; killed - August 30; harvested - September 20, 1979.

Seedpieces of all varieties spaced 9 inches apart.

Fertilization: 160-240-240.

²Growth cracked tubers.

Vermont Table 5. Chip color indices for potato varieties grown at
3 Vermont locations - 1979

Variety	Location and Chip Color ¹		
	Burlington	Brandon	Elmore
Alaska Red	7.8		
Atlantic	7.2		
Bake King	9.4		
Batoche	10.0		
Belchip	6.6		
Belleisle	7.0		
BelRus	7.6	7.3	7.6
Bison	8.1		
Buckskin	5.4		
Butte		8.8	9.1
Campbell 11	5.4		
Campbell 12	8.9		
Campbell 13	6.8		
Centennial Russet	9.4		
Cobbler	8.6	8.5	8.3
Croatan	6.0	6.6	6.7
Delta Gold		7.8	7.8
Green Mountain	9.8		
Hudson	7.9		
Jemseg		8.3	8.2
Katahdin	7.4	7.9	7.0
Kennebec	7.4	7.1	7.8
Russet Burbank	8.2	8.0	8.5
Superior	8.2		
Snowchip	6.1		
AF92-3	7.7		
AF186-2	5.0		
AF205-9		5.6	6.0
AK6-5		6.5	7.7
AK28		6.2	6.2
B6503-2	5.8	5.3	5.0
B6969-2	7.8	8.1	7.3
B6987-184	5.6		
B7583-6	8.8		
B7802-2		7.8	7.5
BR7088-18	6.0	5.8	6.3
BR7090-17	6.6		
BR7093-23	6.0	7.0	5.6
C72107-13A	8.4		
CA02-7	6.1		
CC26-1A	7.8		
CD106-16	7.4		

Table 5 - continued

Variety	Location and Chip Color ¹		
	Burlington	Brandon	Elmore
F69016		7.5	7.0
W564-3A	9.8	9.3	9.5
W718	6.9	7.0	7.8
Bayes L.S.D. (0.05)	1.3	0.9	0.8

¹Chips with lower indices are lighter in color.

VIRGINIA

Boyett Graves
Va. Truck & Orn. Res. Sta., Painter, Va.

Variety and Seedling Evaluation

General Plot Procedures and Growing Conditions. One hundred and eighty seven varieties and seedlings were grown in one replicate. Twenty hill plots (1st Year Observational Trials); 25 hill, 4 replicate plots (Intermediate Trials); or 25 hill, 5 replicate (Advanced Trials). Plots were planted March 27 and harvested July 9, 10, and 11. Fertilizer was band placed at planting at 1100 lbs. of 10-10-10 per acre. Temik systemic insecticide was banded in the seed furrow at 3 lbs. a.i./acre and no additional insecticide spray was necessary. Rainfall was adequate throughout the growing season for good-excellent growth. One application of Bravo fungicide at 2 pts./A was applied in mid June for Early Blight control.

Tubers were hand harvested and graded with a chain type grader that retained all tubers 1-7/8 inches diameter and larger. Samples for chip color determinations were removed and shipped the same day or one day after harvest. Chip evaluations were made by Wise Foods, Inc., Berwick, Pa.

Round Whites. Table 1 shows evaluations of selections in the Advanced Trial. Yields were unusually high for eastern Virginia summer harvest potatoes due most likely to uniform soil moisture conditions throughout the season and lower than normal night time temperatures during tuber enlargement. As can be seen in Table 1 most of the seedling entries in the trial were in the same yield class (Duncan's mean separation) as Pungo, the local industry standard.

Specific gravity was higher than usual throughout the trial with Atlantic and B6987-184 having gravity readings of 1.1028 and 1.1083 respectively. The "usual" specific gravity of Pungo and Superior in the area is about 1.075 and 1.070.

Chip color was about normal for these eastern Virginia plots. It can be seen that very few seedlings produced chips of marginal marketability. During the past 8 years the general level of specific gravity, chip color and general conformation has been greatly improved in the seedlings from the USDA, Beltsville breeding program (those numbered lines beginning with "B"). Air pollution injury is not uncommon in eastern Virginia. These plots had very few air pollution symptoms even in lines and varieties known to be susceptible and air pollution ratings were not made.

Virginia Table 2 contains ratings and measurements of the Intermediate Trial (those grown for the 2nd year). As was observed in the Advanced Trial, several of the better yielding selections produced tubers that average 6 ounces each indicating early sizing which is a very important consideration in early summer produced potatoes. It should be noted that specific gravity of most selections in this trial as well as the First Year Observational Trial (Virginia Table 3) was above 1.075. Selections in these two plantings are mostly from crosses made

in the past 5 years and reflect the marked improvement in general dry matter content that has occurred in the USDA Beltsville potato breeding program in the past 10 years.

Overall tuber conformation in the Intermediate Trial is noticeably lower than in the Advanced Trial reflecting fewer years of selection at this location.

Virginia Table 3 shows some characteristics of several russet skinned seedlings and variety selections. General problems associated with producing russets in eastern Virginia include low yields and lack of consistent oblong shape from year to year. Of the seedlings in Table 3, B8972-1 appears to be among the most consistent.

Virginia Table 1. Advanced Trial, Round Whites. Characteristics of potato varieties and seedlings; Painter, Va. 1979.

	Yield Cwt/A 1-7/8 inch ⁴	Sp. Grav. 1.0 Omitted	Oz. per Tuber	Tuber Conform. ¹ /	Shape ² /	Chip Color ³ /		
						At Harv.	4 Weekly Chippings	Av.
AF201-4C	379 a	805	6.79	8	3	3	3.0	
C7232-4	366 ab	804	7.57	7	6	1	1.8	
B8599-42	347 abc	766	6.40	6	2	3	2.8	
B8433-4	347 abc	714	6.58	6	2	3	4.4	
B8884-7	344 abc	907	6.72	7	3	3	3.4	
Michibonne	339 abc	789	6.42	6	2	2	3.0	
Ontario	338 abc	826	4.60	6	2			
B8710-1	333 abc	857	6.85	8	1	5	4.6	
B8087-6	332 abc	825	8.73	8	1	5	5.0	
Atlantic	332 abc	1028	5.75	7	2	4	3.2	
B8901-6	332 abc	799	7.07	8	2	2	2.2	
Pungo	326 abcd	819	6.25	6	2	3	3.6	
B7516-9	320 abcd	857	5.97	6	6	2	3.6	
B6969-2	319 abcd	758	5.36	8	1	3	4.0	
B8713-24	317 abcd	940	5.65	7	2	5	4.2	
B8091-8	313 abcd	876	5.01	8	1	3	2.6	
B8685-4	310 abcd	872	6.10	8	3	3	3.4	
Belchip	310 abcd	915	6.26	6	6	2	2.2	
B7744-5	310 abcd	769	5.26	7	1	3	4.4	
B8073-3	307 abcde	744	6.40	7	2	3	3.8	
LaChipper	305 abcde	763	5.73	5	2	5	4.0	
B8618-5	304 abcdef	919	6.34	8	6	2	2.4	
B8761-2	302 abcdef	992	6.12	6	3	4	3.2	
B7516-7	301 abcdef	946	6.40	7	1	3	3.0	
B8498-9	306 abcdef	841	6.82	7	1	1	3.0	
Superior	300 abcdef	781	6.16	7	2	3	3.8	
B8812-15	299 abcdef	792	5.49	7	2	3	3.0	
B8004-8	299 abcdef	785	4.99	8	1	3	3.4	
B8702-2	299 abcdef	784	6.00	5	4	3	3.6	
New Superior	299 abcdef	915	6.67	7	2	4	4.8	
B8615-2	294 abcdef	941	6.15	7	2	2	3.8	
B8392-5	294 abcdef	936	8.46	6	2	3	3.8	
Wauseon	293 abcdef	811	4.81	7	2			
B8019-4	288 bcdefg	736	6.51	6	2	4	5.6	
Michimac	285 cdefg	842	5.90	5	3	5	4.8	
B7592-1	273 cdefg	862	6.97	5	7	2	3.6	
B8798-20	271 cdefg	999	6.08	8	2	3	2.6	
B8588-1	271 cdefg	815	4.77	7	2	4	3.4	
Norchip	270 cdefg	881	4.72	6	3	3	2.6	
B8462-1	264 cdefg	884	5.19	6	4	3	3.0	
B9119-5	261 cdefg	807	6.60	6	3	5	5.4	
B8685-5	261 cdefg	785	5.92	7	3	2	3.0	
B8477-4	256 defg	880	5.98	7	2	3	3.0	
B6987-184	254 defg	1083	5.92	6	7	5	4.2	
B8697-34*	244 defg	853	6.74	7	8			
B8428-10	223 efg	909	4.17	8	2	4	3.8	
New Haig	219 fg	783	5.96	6	2			
Nor. Russet	197 g	743	5.56	6	8			

*Russet skin

Footnotes (at end of Table 2).

VIRGINIA TABLE 2. INTERMEDIATE TRIAL, ROUND WHITES. Characteristics of potato varieties and seedlings grown for 2 years; Painter, Virginia 1979.

	1 7/8 in. + ^{4/}	Oz. per Tuber	Specific Gravity				Chip Color ^{3/}	
				1.0 Omitted	Tuber Conform. ^{1/}	Shape ^{2/}	At Harv.	4 Weekly Chippings
B9155-5	337	a	8.89	897	5	3		
B9073-3	326	a	6.72	726	7	2		
B6969-2	320	a	6.67	801	8	8	5	4.6
Atlantic	313	a	5.16	1072*	7	2	2	2.2
Pungo	312	ab	6.77	851	6	2	3	4.0
B8907-4	298	abc	6.85	904	8	1	2	2.6
B9062-9	297	abc	6.10	811	5	6		
B9153-6	296	abc	7.93	858	8	1	5	4.4
B9224-6	295	abc	5.69	800	7	3		
LaChipper	294	abc	5.31	783	5	2	3	3.6
B9048-7	290	abc	9.82	915	6	6	3	3.6
B7516-9	290	abc	5.19	874	7	4		
Superior	289	abc	6.36	800	7	2	2	2.8
B9019-14	287	abcd	4.47	749	6	2	2	3.2
B9140-14	283	abcd	5.67	934	7	6	3	3.8
B8755-3	260	bcd	4.70	981	7	3	2	2.6
B8832-3	260	bcd	5.28	986	7	2	3	3.2
Norchip	255	cde	4.93	926	6	2	1	2.4
B9205-6	247	cde	5.05	727	7	1		
B9071-5	245	cde	5.79	806	8	3	2	3.2
B8697-29	245	cde	6.65	738	8	9	6	5.2
B9067-6	236	de	4.58	959	8	1	4	4.2
B9071-1	216	e	5.31	940	6	3	2	3.0
B9104-8	213	e	4.87	967	7	3		
B8812-4	211	e	4.29	830	8	1		
B9000-2	151	f	4.88	990	6	3		
B8681-5	142	f	4.60	1079*	6	4		

*1.1072, Atlantic; 1.1079, B8681-5

^{1/} Tuber Conformation: 1 = very poor, 5 - fair, 7 - good, 9 = exceptional.

^{2/} Shape: 1 = very round, 2 = mostly very round, 3 = round to slightly oblong,
4 = mostly oblong, 5 = oblong, 6 = oblong to slightly long,
7 = oblong-long, 8 = most long, 9 = long cylindrical.

^{3/} Chip Color: 1 = very light chip; 5 = light brown, barely marketable; 6-12 = brown to black, unmarketable. At harvest color was made within 36 hours of harvest. Tubers held at 70°F throughout the 4 week chipping period.

^{4/} Separation by Duncan's Multiple Range Test, 1%.

VIRGINIA TABLE 3. RUSSET SKINNED POTATO VARIETIES AND SELECTIONS:
Painter, Virginia 1979.

	Yield Cwt/A Size A	Oz./ Tuber	Specific Gravity		
			1.0 Omitted	Tuber Conform. ^{1/}	Shape ^{2/}
Pungo	323	6.00	89	6	2
Superior	313	6.38	81	7	1
Norgold Russet 7	298	6.40	73	6	7
B7583-6	285	5.57	92	8	6
Norgold Russet M	276	6.18	78	7	7
A68678	256	5.31	97	-	-
Norgold Russet 10	238	5.40	78	8	7
B8972-1	238	6.87	85	9	8
Norgold Russet 35	234	5.54	72	7	7
Norgold Russet	228	5.42	75	6	5
Centennial	225	6.04	79	8	7
B8922-10	195	5.91	85	6	8
B8812-16	170	5.99	89	6	9
B8922-4	132	4.72	76	8	8

Russets Grown for First Time at Painter, 1979

B9132-12	156			
B9137-9	189	5.30		7
B9147-3	284	7.15	7	5
B9281-9	176	6.90	7	8
B9296-9	297	5.42	8	8
B9116-9	306	6.56	5	8
B9200-3	229	5.05	6	3
B9230-5	212	6.47	8	9
B9219-2	226	6.16	7	7

^{1/}Tuber Conformation: 1 = very poor, 5 = fair, 7 = good, 9 = exceptional.

^{2/}Shape: 1 = very round, 2 = mostly very round, 3 = round to slightly oblong,
4 = mostly oblong, 5 = oblong, 6 - oblong to slightly long,
7 = oblong-long, 8 = most long. 9 = long cylindrical.

WEST VIRGINIA

R. J. Young, S. I. Pencis, R. E. Adams, and J. A. Hayes

Test For Multigenic Resistance To Potato Late Blight

Late Blight Trial 1979. The multigenic late blight test was conducted on the Plant and Soil Sciences Research farm located at Morgantown, West Virginia. Test clones were hand set in preformed furrows on May 7, 1979. Fertilizer and temik were incorporated into the furrows at rates determined by soil test and mfg. recommendations respectively. Clones were evaluated in 5-10 hill nonreplicated plots. Sebago was machine planted in the outer two boarder rows and then alternating in every 2 rows throughout the test plot. The leaves of Sebago were inoculated with races-1,3,4 of Phytophthora infestans on July 20, 1979. Phytophthora infestans developed rapidly in the succeeding days with Katahdin showing 75-80% infection by August 3. Foliage was evaluated on August 3, and again on August 28. Temperature and moisture conditions remained favorable for development of late blight through the evaluation period. See West Virginia table 1 for detailed results of these evaluations.

West Virginia Table 1. Evaluation of seedling clones and varieties for multigenic resistance to Phytophthora infestans, Race 1,3,4, 1979.

1979 Field No.	Pedigree	Aug. 3			Aug. 28			
		Disease Class ^{1/}	Lesion Size ^{2/}	Sporulation ^{3/}	Disease Class	Lesion Size	Sporulation	
<u>NE 107 Material</u>								
<u>EARLY MATURITY</u>								
1202	Bake King	4+	L	H	5	-	-	
1188	Kennebec	3+	L	M/H	5-	-	-	
1200	Jemsig	4+	L	H	5	-	-	
1195	Norchip	4	L	H	5	-	-	
1196	Norgold	2+	L	M/H	5	-	-	
1197	Peconic	4	L	M/H	5	-	-	
1201	Superior	4+	L	H	5	-	-	
1198	Tobique	4+	L	H	5	-	-	
1199	cc 26-1A	4	L	H	5	-	-	
<u>MEDIUM MATURITY</u>								
1192	Atlantic	4+	L	H	5	-	-	
1194	Campbell-13	5	-	-	5	-	-	
1193	Denali	4+	L	H	5	-	-	
1188	Kennebec	3+	L	M/H	5	-	-	
1186	Shurchip	3+	L	M/H	5	-	-	
1201	Superior	4+	L	H	5	-	-	
1189	AF205-9	4+	L	H	5	-	-	
1190	AF238-21	3+	L	H	5	-	-	
1191	B7802-2	0	-	-	5	-	-	
1187	B7848-2	3+	L	M/H	5	-	-	
<u>LATE MATURITY</u>								
1204	Belchip	4	L	M/H	5	-	-	
1210	Belleisle	2	L	H	5	-	-	
1212	Buckskin	2+	L	M/H	5	-	-	
1208	Katahdin	4	L	M/H	5	-	-	
1207	AF92-3	4+	L	M	5	-	-	
1209	BR7090-17	4+	L	M/H	5	-	-	
1211	C72107-13A	4+	L	M/H	5	-	-	
1206	CA02-7	2+	L	M/H	5	-	-	
1205	CD106-16	4+	L	M/H	5	-	-	
1203	F96016	4+	L	H	5	-	-	
<u>RUSSET MATERIAL</u>								
1215	Bute	3+	L	M/H	5	-	-	
1216	BelRus	4+	L	H	5	-	-	
1214	Centennial Russet	4+	L	H	5	-	-	
1217	R. Burbank	3	L	M/H	5	-	-	
1213	B7583-6	5-	L	H	5	-	-	

West Virginia Table 1. (Continued)

1979 Field No. Pedigree		Aug. 3			Aug. 28		
		Disease Class ^{1/}	Lesion Size ^{2/}	Sporulation ^{3/}	Disease Class	Lesion Size	Sporulation
MAINE BREEDING PROGRAM (A1 Reeves)							
1218	AF76-7	5	-	-	5	-	-
1219	AF201-25	4+	L	H	5	-	-
1220	AF221-1	3+	L	H	5	-	-
1221	AF223-1	4+	L	H	5	-	-
1222	AF236-1	3+	M/H	5	5	-	-
1223	AF238-21	4+	L	H	5	-	-
1224	AF238-66	4+	L	H	5	-	-
1225	AF307-5	4+	L	H	5	-	-
1226	AF398-5	0	-	-	Plants dead		
1227	CF7518-4	5-	L	H	5	-	-
1228	CF7518-16	4+	L	H	5	-	-
1229	CF7548-11	5-	L	H	5	-	-
1230	CF7622-1	Poor plants - No test			-	-	-
1231	CF7622-4	3+	L	M/H	5	-	-
1232	CF7622-10	0	-	-	Plants dead		
1233	CF76111-2	No test			-	-	-
1234	CF76114-4	3-	L	M/H	5	-	-
1235	CF76118-1	Poor plants - No test			-	-	-
1236	CF76120-2	3+	L	M/H	5	-	-
1237	CF76126-1	Poor plants - No test			-	-	-
1238	CF76150-6	4	L	H	5	-	-
1239	CF76183-2	Poor plants - No test			-	-	-
1240	CD11-5a	3+	L	M/H	5	-	-
1241	WF564-3	4	L	H	5	-	-
CAMPBELL SOUP MATERIAL (D. Nickerson)							
1242	Campbell-11	3+	L	H	5	-	-
1243	C7333-23	3+	L	H	5	-	-
1244	CD106-16	4-	L	H	5	-	-
1245	CD138-4R	4+	L	H	5	-	-
1246	C74109-8	2	M/L	M/H	5-	-	-
1247	Campbell-12	2+	M/L	M/H	5-	-	-
1248	C74141-3	3+	L	H	5	-	-
1249	C7489-9	4+	L	H	5	-	-
1250	C74906-P	2+	L	H	5	-	-
1251	C7490-2	3+	L	H	5	-	-
1252	C7646-1	Poor plants - No test			-	-	-
1253	I Cobbler	4+	L	H	5	-	-
W.V.I. MATERIAL							
1041	WVI-2-5	0	-	-	3+	M/L	M
1042	WVI-2-14	2	L	L	3+	M	L
1043	WVI-2-20	0	-	-	3+	M	L/M
1044	WVI-2-24	2-	L	L	3+	M	M
1045	WVI-2-25	Trace		-	3+	M/L	L

West Virginia Table 1. (Continued)

1979 Field No.	Pedigree	Aug. 3			Aug. 28		
		Disease Class 1/	Lesion Size 2/	Sporulation 3/	Disease Class	Lesion Size	Sporulation
1046	WVI-2-35 (Rn)	0	-	-	0	-	-
1047	WVI-2-40	2+	S/M	L	3+	M	L
1048	WVI-3-55	1+	M	L	3+	S/M	L
1049	WVI-5-9	2+	M	L	4	M	M
1050	WVI-5-12	2+	L	L	3+	M/L	M
1051	WVI-6-11	2-	M	L/M	3+	M	M
1052	WVI-6-14	Trace	R	TR	4+	M	L
1053	WVI-6-18	0	-	-	1+	S/M	L
1054	WVI-6-19	2+	L	M	3+	L	M
1055	WVI-6-21	2+	L	M	3+	M/L	M
1056	WVI-6-25	1+	R	L	2+	R	None
1057	WVI-6-31	1+	R	None	2+	L	L/M
1058	WVI-6-34	1+	R	L	3+	L	L/M
1059	WVI-6-38	2	L	M	4+	L	M
1060	WVI-4-52 4/	0	-	-	Trace	-	-
1061	WVI-7-69	3+	L	M	5	-	-
1062	WVI-7-84 (Rn)	0	-	-	0	-	-
1063	WVI-14-14	3+	L	H	5	-	-
1064	WVI-16-3 (Rn)	0	-	-	0	-	-
1065	WVI-16-7 (Rn)	0	-	-	Plants dead	-	-
1066	WVI-16-8	2	M/L	L	3	M	L
1067	WVI-16-14	1+	M	L	2	L	M
1068	WVI-16-16	2-	M	L	3	M/L	L/M
1069	WVI-16-17	2+	S/M	L	4+	M/L	M/H
1070	WVI-16-19	2-	S	L	3 5/	-	-
1071	WVI-16-21	0	-	-	Trace 5/	-	-
1072	WVI-16-22 (Rn)	0	-	-	0	-	-
1073	WVI-16-23 (Rn)	0	-	-	0	-	-
1074	WVI-16-26	2+	M	M	3+	M	M
1075	WVI-16-28 (Rn)	0	-	-	0	-	-
1076	WVI-16-29	0	-	-	3	S/R	L
1077	WVI-16-42	3+	L	M/H	4+	L	M
1078	WVI-16-44	0	-	-	Plants dead	-	-
1079	WVI-16-47	0	-	-	3+	M	L/M
1080	WVI-16-1	2-	SR	None	3+	M/L	M
1081	WVI-10-1 (Rn)	0	-	-	0	-	-
1082	WVI-9-3	2+	L	L	3+	L (Few)	M
1083	WVI-12-2	2-	L	M	Plants dead	-	-
1084	WVI-15-2 (Rn)	0	-	-	0	-	-
1085	WVI-15-4 (Rn)	0	-	-	0	-	-
1086	WVI-15-7 (Rn)	0	-	-	0	-	-
1087	WVI-15-14 (Rn)	0	-	-	0	-	-
1088	WVI-15-15 (Rn)	0	-	-	0	-	-
1089	WVI-15-16 (Rn)	0	-	-	0	-	-
1090	WVI-15-22 (Rn)	0	-	-	0	-	-
1091	WVI-15-24 (Rn)	0	-	-	0	-	-

West Virginia Table 1. (Continued)

1979 Field No.	Pedigree	Aug. 3			Aug. 28		
		Disease Class 1/	Lesion Size 2/	Sporulation 3/	Disease Class	Lesion Size	Sporulation
1092	WVI-8-1	4	L	M/H	5	-	-
1093	WVI-8-3	2+	L	M	4+	M/L	M
1094	WVI-8-7	2+	M	M	3+	M	M
1095	WVI-8-8	1+	M	M	3+	M/L	M
1096	WVI-8-11	2+	L	L	4+	L	M
1097	WVI-8-12	1+	M (Few)	L	3+	L	M/H
1098	WVI-8-13	4	L	M/H	5	-	-
1099	WVI-8-16	2+	SR	L	3+	SR	M
1100	WVI-8-17	2+	L	M	3+	MR	M
1101	WVI-8-18 (Rn)	0	-	-	0	-	-
1102	WVI-8-20	2	MR	L	3+	M/L	M
1103	WVI-8-21	2	M	M	3+	MR	L/M
1104	WVI-8-23	0	-	-	2+	MR	L
1105	WVI-8-26	1+	M	M	3+	M/L	M
1106	WVI-8-27 (Rn)	0	-	-	0	-	-
1107	WVI-8-29	2	M	M	3+	M/L	M/H
1108	WVI-8-30	2+	MR	L	5	-	-
1109	WVI-8-31	2	L	M	5	-	-
1110	WVI-8-33 (Rn)	0	-	-	0	-	-
1111	WVI-8-34	2-	L	M	4+	L	M/H
1112	WVI-8-25	4-	L	H	5	-	-
1113	WVI-11-15 (Rn)	0	-	-	0	-	-
1114	WVI-11-25 (Rn)	0	-	-	0	-	-
1115	WVI-11-37 (Rn)	0	-	-	0	-	-
1116	WVI-11-38 (Rn)	0	-	-	0	-	-
1117	WVI-11-45 (Rn)	0	-	-	0	-	-
1118	WVI-11-46 (Rn)	0	-	-	0	-	-
1119	WVI-11-48	2	MR	L	4+	-	-
1120	WVI-11-49 4/	2-	MR	L	4+	-	-
1121	WVI-11-50 (Rn)	0	-	-	0	-	-
1122	WVI-11-51 (Rn)	0	-	-	0	-	-
1123	WVI-11-53 (Rn)	0	-	-	0	-	-
1124	WVI-11-56 (Rn)	0	-	-	0	-	-
1125	WVI-11-65 (Rn)	0	-	-	0	-	-
1126	WVI-11-66	0	-	-	4+	L	M/H
1127	WVI-11-69	2	L	M	4+	L	M/H
1129	WVI-11-75	2	L	L	4	L	H
1130	WVI-11-76	2	L	M/H	4	L	M/H
1131	WVI-11-77	2	L	M	4	L	M
ANDIGENA MATERIAL FROM R. TARN							
1171	Tarn-A453	0	-	-	0	-	-
1172	Tarn-A249	0	-	-	2-	R	None
1173	Tarn-A421	0	-	-	0	-	-
1174	Tarn-A541	0	-	-	2+	SR	None
1175	Tarn-A276	0	-	-	0	-	-

West Virginia Table 1. (Continued)

1979 Field No.	Pedigree	Aug. 3			Aug. 28		
		Disease Class	Lesion Size	Sporulation	Disease Class	Lesion Size	Sporulation
1176	Tarn-A298	0	-	-	0	-	-
1177	Tarn-A505	0	-	-	Trace	-	-
1178	Tarn-A203	0	-	-	4+	L	L/M
1179	Tarn-A132	0	-	-	2+	M	M
1180	Tarn-A105	0	-	-	0	-	-

1/ Disease Class - Foliage evaluated on a scale of 0-5, where 0 = no blight, and 5 = plants dead from late blight.

2/ Lesion Size - L - lesions large 2.5 cm or larger and increasing in size: M = lesions less than 2.5 cm but greater than 1.27 cm; S = lesions less than 1.27 cm; R = restricted lesions, non-sporulating and less than 1.27 cm.

3/ Sporulation - H = heavy sporulation; M = Moderate sporulation; L = light sporulation; TR = trace of springia.

4/ Air pollution severe, difficult to evaluate late blight.

5/ 70-80% leaflets with numerous small fleck-like non-sporulating lesions.

Rn - Additional R-genes present.

WISCONSIN

L. E. Towill and R. E. Hanneman, Jr.

Genetics, Cytogenetics and Physiology of the Tuber-bearing Solanum Species

(Cooperative USDA/SEA/AR and Wisconsin Experiment Station)

Cryogenic Germplasm Preservation. Experiments with shoot tips, true seed, and pollen have shown that low temperature (about -196°C, liquid nitrogen) storage is feasible for potato germplasm preservation. True seed retained essentially 100 percent viability when cooled to and warmed from -196°C. Pollen survival after fast cooling to and fast warming from -196°C depended upon the moisture content of the pollen. Drying pollen over anhydrous CaCl_2 for two or more days reduced the moisture content enough so that there was high viability after exposure to liquid nitrogen. Such results have been obtained with several species of the tuber-bearing Solanums. Two methods for cryogenic preservation of clonal lines (using isolated 0.5 mm shoot tips) have been investigated. A 'rapid' freezing procedure (plunging into liquid nitrogen on the tip of a needle) gave survival in several species, but the percent surviving varied considerably from experiment to experiment. An 'optimum rate' cooling procedure to temperatures of -40°C or -50°C followed by rapid cooling to -196°C gave more reproducible survival in our model system (*S. etuberosum*) and in several other species (including cultivars). Although further tests are needed, the initial conclusion is that extended storage of potato germplasm is a realistic goal and presents a supplementary safe storage mechanism for IR-1 Potato Introduction Project materials.

Thoughts on the Adaptation of Wild Species of the Potato to the North Temperate Region. This program has been actively involved in the adaptation of the wild and cultivated species of the tuber-bearing Solanums to the north temperate region. Between 1966 and 1968, Dr. Rowe started several bulk populations among which were *Solanum chacoense*, *S. microdontum*, *S. sparsipilum*, Gp. *Stenotomum* and hybrids with Gp. *Tuberosum* haploids. Two parallel lines from each population were developed - one population underwent selection for tuberization and the other did not. In a study in 1977, these populations were compared for percent tuberization and yield. The unselected species and hybrid populations indicated no change for either character over five generations. Selection in Gp. *Stenotomum* was highly effective in the first generation. The species-haploid hybrids which underwent selection for tuberization provided modest to steady improvement over five generations of selection. Gp. *Tuberosum* haploids contributed significantly to yield and tuberization.

Seventeen new species populations were started and now are in their first or second cycle of selections for tuberization. The initial populations were set up using all accessions of each species in the IR-1 collection which were then inter-mated. Those that tuberized among the initial accessions were kept to start a second population. Preliminary evidence indicates that there is little difference in tuberization between the two populations. It appears that selection for tuberization provides little gain in moving these populations towards better tuberization.

Adaptation of wild species seems most efficiently pursued by using Gp. Tuberous haploids to hybridize with the species initially, taking advantage of immediate adaptation. Adaptation of the wild species, without the infusion of Gp. Tuberous germplasm, appears to be a very long range process.

Genetics of Endosperm Dysfunction. Our group has previously reported on an Endosperm Balance Factor hypothesis which was developed to explain the behavior of the endosperm in interspecific crosses. This concept has been expanded greatly from the initial idea and has been given a new name - Endosperm Balance Number (EBN) hypothesis. It has important implications to 2n gametes, evolution, and the origin of disomic polyploids.

The basis of the idea is that the effective ploidy in the endosperm of a species may be different from its actual ploidy. For example, if 2x Solanum chacoense is arbitrarily assigned 2 EBN, it is found from crossing experiments that most diploids are also 2 EBN and most tetraploids 4 EBN. However, some tetraploids (e.g. S. acaule) are 2 EBN - i.e. they are effectively diploids in the endosperm. All hexaploids studied are not 6 EBN but 4 EBN - i.e. they are effectively tetraploids. This raises the interesting possibility that there might be 1 EBN diploids, which would not cross with other 2 EBN diploids.

There is evidence in the literature that such 1 EBN diploids exist in tomato, Datura, and oats. A search has been begun for such diploids in the potato species. Some of our own preliminary work and a review of extant crossing data suggest that some or all of the diploids in series Bulbocastana, Pinnatisecta, and Etuberosa may be 1 EBN. If this proves to be the case, it would not only have important evolutionary implications but may also be helpful in overcoming crossability barriers which impede the use of this germplasm.

Our research has also been concerned with the genetic control of effective ploidy in the endosperm. The use of Datura and potato trisomics indicate that no single gene or chromosome can change the effective ploidy from the maternal side. Other studies using mutagens indicate that a single gene can not change the effective endosperm ploidy from the paternal side.

Reciprocal Differences in the Potato. Significant reciprocal differences in bulk populations of Phureja-Tuberous F_1 hybrids were observed for photoperiod reaction, flowering, vine maturity and yield. In F_2 bulk populations, reciprocal differences were significantly reduced, suggesting that the differences were not simply cytoplasmic in nature. The reciprocal difference for yield in the F_1 hybrids was 149 percent and 50 percent in the F_2 hybrids. The reciprocal families differed from each other with a bias toward their maternal parent.

Reciprocal crosses were made between clones to study the basis of reciprocal cross differences in more detail. In the first study, twelve families were generated based on the assumption that the reciprocal differences were due to a simple cytoplasmic factor, which would be determined by the taxonomic origin of the cytoplasm. Therefore, although the parents of these six reciprocal pairs differed for the taxonomic origin of their cytoplasm, they

did not differ dramatically for their maturity. When these families were observed in greenhouse and field trials, reciprocal differences for maturity, yield, or for any other character were not large enough to be considered significant, although there was a tendency toward the maternal parent's type.

In a second study, two additional families represented reciprocals generated between a full-season *Tuberosum* cultivar and a semi-selected *Andigena* clone. When observed two years as seedlings and one year grown from tubers, these reciprocals clearly differed for extent of flowering and tuber yield, with the yield difference being 90 percent and 18 percent for the seedling trials and 44 percent for the tuber trial.

Seventeen other families represented four sets of crosses where very early *Tuberosum* cultivars were reciprocally crossed with unselected late maturing *Andigena* clones. The cultivars and the *Andigena* clones were selfed. In four of the families, rather than selfing the parents, the crosses were made early cultivar x early cultivar, and *Andigena* x *Andigena*, thus eliminating the element of inbreeding depression. In the field trials of all four sets, the parental types differed greatly for flowering, vine maturity, and yield. In all of the reciprocal crosses, there were no differences for flowering or vine maturity but in every case, there were significant differences for yield.

Finally four families represented crosses with the early variety, "Superior" and its late maturing sport, or "bolter", Superior 'L'. The reciprocals and the parental selfs should theoretically only differ for a single gene mutation, or at most for a chromosome or chromosome fragment lost or substituted. Outside of this difference, all four families should be equivalent to Superior selfed. Differences between these crosses were not large, but in every instance the hybrids differed from their reciprocal in the direction of their maternal parent. In the greenhouse these differences were small, but in the field grown from tubers, the reciprocal yield difference was 23 percent, and in the field trial grown from seed the difference was 14 percent. In the seedling trial maturity differences were significant at the 10 percent level, with the reciprocals essentially having the same maturities of their maternal parents.

Optimum Heterozygosity in the Potato. Maximal heterozygosity in a tetraploid will result from combining genetic diversity from four different taxonomic groups or species into a single complex hybrid. Since this level of heterozygosity has not yet been synthesized, one can not be certain to what extent this extra heterozygosity will be beneficial. This study was initiated to examine the question of what will be the optimal level of heterozygosity. Heterozygosity in the potato was taken one step further than before, by combining the selected *Andigena*-*Tuberosum* hybrids of Plaisted and Tarn, with the Phureja-*Tuberosum* hybrids with 2n pollen of Peloquin. These 3-way crosses (with three contributing taxonomic groups), resulted in complex hybrids which should be more heterozygous than either the *Andigena*-*Tuberosum* hybrids or the (4x x 2x) hybrids (DT). Ten families of such 3-way crosses were compared to nine 2-way crosses (DT's, identical to 3-way crosses but with straight *Tuberosum* as females), and nine 1-way crosses (conventional cultivar x cultivar crosses). These 28 families were put into four different yield trials - one grown from seedlings, one grown from unselected tubers, and two grown from selected tubers, (one at each of two locations).

The hybrid crosses substantially out-yielded the conventional 1-way crosses, with no significant difference between the 2-way and 3-way crosses. Over all the trials, the hybrids out-yielded the conventional crosses by 42 percent. As with yield, the vine vigour of the hybrids was always significantly greater in the hybrids than in the 1-way crosses, with no difference between the 2-way and 3-way hybrids. Vine maturity did not significantly differ between the cross types, although the hybrids tended to have later maturity scores than the 1-way crosses. Although the correlation between maturity and yield was always low, yields were corrected for maturity differences using regression analysis. The adjusted 2-way mean yields were greater than the adjusted 1-way and 3-way mean yields in all four trials.

The total variances, and the between-family variances for the yields of the hybrids were generally much greater than for the 1-way crosses, suggesting that selection should be more efficient in these populations, although the coefficient of variability for these variances did not reveal a clear trend. Within family variance also tended to be greater for the yields of the hybrids, compared to the 1-way crosses, but the within-family coefficient of variability was consistently lower in the hybrids than in the conventional crosses.

These results tell us two important things:

- (1) The hybrids are markedly superior to conventional crosses for total yield, yield variance, and vine vigour, with families that are somewhat more uniform.
- (2) The 3-way hybrids are not superior to the 2-way hybrids for either total yield or vine vigour. When adjusted for maturity, three-way yields tend to be slightly lower than 2-way yields.

It is clear that substantial yield gains can be made using the approach of increasing heterozygosity. This study indicates that at a certain point there is a heterotic threshold where increasing heterozygosity does not increase heterosis. The DT, 2-way, approach to potato breeding, seems to be the most direct method of reaching a near-optimal level of heterozygosity.

Gibberellin-induced Flowering. A few distinctive Peruvian species of the tuber-bearing Solanums have appeared over the years to require optimal conditions other than day-length to flower. Attempts to simulate an environment conducive to flowering such species have been unsuccessful. Under controlled conditions, inflorescences are initiated but generally remain a tight cluster of tiny calyx-inclosed buds until abscission. Any flowering is sporadic, and ordinarily confined to a few flowers on one or two plants within a population.

Last year the use of gibberellin to promote flowering was contrived, considering its routine use to promote seed germination. Populations of 40-60 seedlings of two accessions each of two species averse to flowering, Solanum chiquidense and S. immite, were utilized in a preliminary trial. Each seedling population was equally divided between treatment and control. Each inflorescence initiated within the treatment half was sprayed once with a gibberellin concentration of 2000 ppm, and each inflorescence initiated within the control half was sprayed with distilled water.

The gibberellin treatment of suppressed inflorescences proved to be highly effective, generally stimulating normal flower development. The appearance of partially developed inflorescences in a population of any species introduction should no longer impede seed increase and restrict seed distribution.





